Supreme Court, U. S.
FILED
JAN 5 1976
MICHAEL RODAK, JR., CLERK

SUPPLEMENTAL APPENDIX

IN THE

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1975

No. 75-110

BERNARD A. SAKRAIDA,

Petitioner,

versus

AG PRO, INC.,

Respondent.

ON WRIT OF CERTIORARI TO THE UNITED
STATES COURT OF APPEALS FOR THE FIFTH CIRCUIT

TABLE OF CONTENTS

	Page
Rule 1 Fed.R.Civ.P.	1
Rule 60(b)(2) Fed.R.Civ.P.	1
35 U.S.C. §101	2
35 U.S.C. §102	2, 3
35 U.S.C. §103	4
35 U.S.C. §282	4, 5
Motion To Produce	6
Transcript of Proceedings (February 6, 1974)	7-10
Gribble et al Patent No. 3,223,070	11-17
Luks Patent No. 1,968,564	18-26
Kreutzer Patent No. 1,981,417	27-44
Kreutzer Patent No. 1,981,418	45-54
McCornack Patent No. 2,081,947	55-74
Bogert Patent No. 2,233,766	75-83
Ingraham Patent No. 2,294,781	84-87
Anstiss et al Patent No. 2,691,359	88-91
French Patent No. 1,246,418	92-96
British Patent No. 914,649	97-100
Cattle Shelters and Equipment for South Carolina, Extension Agricultural Engineering Handbook No. 2, Dec. 1958	101-103
The Way Cows Will be Milked on Your Farm "Tomorrow", Babson Bros., Dairy Research Service, 1959	104, 105
After Black Rock: New Tests Of Patentability -- The Old Tests Of Invention	106-134

FEDERAL RULES OF CIVIL PROCEDURE

Rule 1 Fed.R.Civ.P.

SCOPE OF RULES

These rules govern the procedure in the United States district courts in all suits of a civil nature whether cognizable as cases at law or in equity or in admiralty, with the exceptions stated in Rule 81. They shall be construed to secure the just, speedy, and inexpensive determination of every action.

* * *

Rule 60 Fed.R.Civ.P.

RELIEF FROM JUDGMENT OR ORDER

(b) Mistakes; Inadvertence; Excusable Neglect; Newly Discovered Evidence; Fraud, etc. On motion and upon such terms as are just, the court may relieve a party or his legal representative from a final judgment, order or proceeding for the following reasons: . . . (2) newly discovered evidence which by due diligence could not have been discovered in time to move for a new trial under Rule 59(b); . . . . The motion shall be made within a reasonable time, and for reasons (1), (2), and (3) not more than one year after the judgment, order or proceeding was entered or taken. A motion under this subdivision (b) does not affect the finality of a judgment or suspend its operation.

TITLE 35 - UNITED STATES CODE - PATENTS

35 U.S.C. §101 - Inventions patentable

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title. July 19, 1952, c. 950, § 1, 66 Stat. 797.

* * *

35 U.S.C. §102 - Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless--

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented, or was the subject of an inventor's

certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or

(f) he did not himself invent the subject matter sought to be patented, or

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other. July 19, 1952, c. 950, § 1, 66 Stat. 797.

35 U.S.C. §103 - Conditions for patentability; non-obvious subject matter

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made. July 19, 1952, c. 950, § 1, 66 Stat. 798.

* * *

35 U.S.C. §282 - Presumption of validity; defenses

A patent shall be presumed valid. The burden of establishing invalidity of a patent shall rest on a party asserting it.

. . . .

In actions involving the validity or infringement of a patent the party asserting invalidity or noninfringement shall give notice in the pleadings or otherwise in writing to the adverse party at least thirty days before the trial, of the country, number, date, and name of the patentee of any patent, the title, date, and page numbers of any publication to be

relied upon as anticipation of the patent in suit or, except in actions in the United States Court of Claims, as showing the state of the art, and the name and address of any person who may be relied upon as the prior inventor or as having prior knowledge of or as having previously used or offered for sale the invention of the patent in suit. In the absence of such notice proof of the said matters may not be made at the trial except on such terms as the court requires. July 19, 1952, c. 950, § 1, 66 Stat. 812.

MOTION TO PRODUCE

Pursuant to Rule 34 F.R.C.P. plaintiff requests defendant, Bernard A. Sakraida, and his attorney, J. F. Hulse, to produce and permit plaintiff's attorneys to inspect and copy each of the following documents:

1. All notes, memoranda, or any other recordation of telephone conversations between them and W. C. Fairbank of Riverside, California.

2. All correspondence between Bernard A. Sakraida and/or J. F. Hulse and W. C. Fairbank including, but not limited to, copies made of enclosures (identified by W. C. Fairbank in his deposition taken August 16, 1973 as twenty-one letters) which accompanied a letter sent by W. C. Fairbank to J. F. Hulse in 1969.

3. All documentary evidence purportedly disclosing prior art pertinent to United States Letters Patent 3,223,070.

Each of the documents called for is to be produced for inspection and copying by September 24, 1973, at the offices of Scott, Hulse, Marshall & Feuille, 11-D El Paso National Bank Building, El Paso, Texas 79901.

KOLISCH, HARTWELL & DICKINSON

By_____
J. Pierre Kolisch
Of Attorneys for Plaintiff

Filed: August 23, 1973

TRANSCRIPT OF PROCEEDINGS
February 6, 1974

[15] THE COURT:

Number 3, what about Number 3?

MR. KOLISCH:

Number 3 would cover any documentary evidence on which they would rely if the Court gets to the question of hearing the merits of the case.

THE COURT:

[16] Now that would go to the infringement question, if any.

MR. KOLISCH:

It would go to the question of validity.

THE COURT:

Validity?

MR. KOLISCH:

Yes. And we are entitled to see such documents, I believe, and so to cover anything that you- -

THE COURT:

Let me just ask Mr. Hulse if he understands Number 3; do you understand Number 3, what he wants in Number 3, and do you have anything there that would throw any light on Number 3?

MR. HULSE:

I am not sure what he wants, but we have some exhibits that we want to offer this afternoon.

THE COURT:

In other words, all documents purportedly to show the prior art, and are pertinent to United States letter to patent 3,233,070, those will all be presented today that you have?

MR. HULSE:

Yes, sir.

[17] THE COURT:

Okay. That's your answer. Reserving the right for them to look at the memorandum, you may proceed now to put on your newly discovered- -

MR. KOLISCH:

Your Honor, would you hear us first on the question as to whether or not they should be given the opportunity to put on the newly discovered evidence; they should be- -

THE COURT:

If I understand the Fifth Circuit's direction to me, that's why we are here.

MR. KOLISCH:

As I understand the Fifth Circuit's direction was to hear whether or not there should be a hearing on the so-called newly discovered evidence.

THE COURT:

Well, wouldn't it be just as easy or quick to hear the whole matter now and I'll rule on all of it at

the conclusion of the evidence.

MR. KOLISCH:

Would the Court- - If the Court- -

THE COURT:

There would be a duplication involved if I should decided to hear it, and it says here, "The [18] District Court will hear and determine said motion proceeding on the issue of infringement, and- - "

MR. KOLISCH:

No, that's the second- -

THE COURT:

"- -District Court . . . (counsel and Court talking at the same time.) . . . subject, however, to the Court's consideration of a motion filed under Rule 60B 2 to be filed in District Court by the Defendant, Sakraida- - "

MR. KOLISCH:

Sakraida.

THE COURT:

Sakraida. "- -on the issue of patent validity based on newly discovered evidence. The District Court will hear and determine said motion." How am I going to pass on it unless I hear it?

MR. HUNTER:

If we could show the Court this this was not newly discovered evidence or it was evidence which he

could not have obtained with diligence, then I think that- -

THE COURT:

Well, I think that the burden is upon the Movant under Rule 60b to prove- -

[19] MR. KOLISCH:

Yes, sir.

THE COURT:

And I think I am going to give him an opportunity to prove that this is newly discovered evidence and it is entitled to be offered, and under these circumstances that they will get a new trial of it heard, but the only way I know to do that is see what they can do; the burden is their's under Rule 60b. As I understand it.

MR. KOLISCH:

I think that's correct. I just wanted to get that procedure straight.

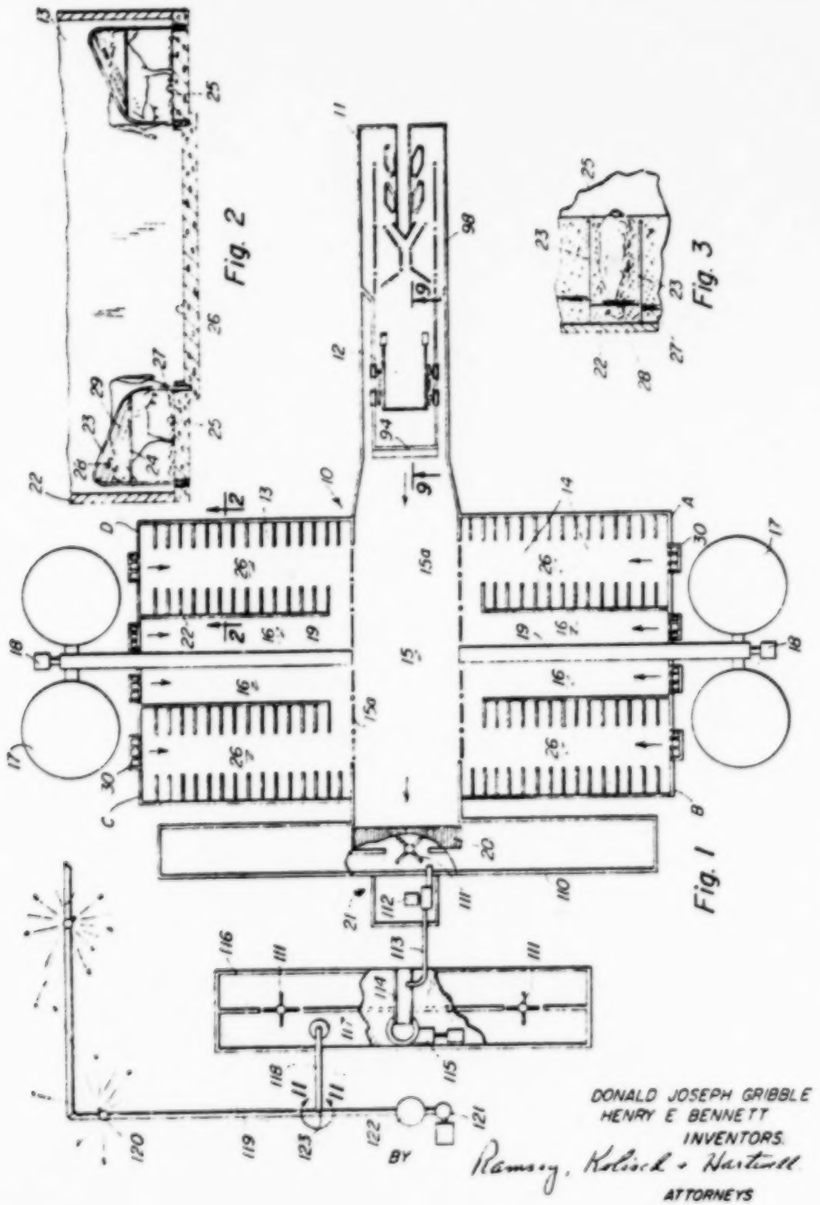
THE COURT:

All right. Let's proceed, Mr. Hulse. I think that the burden is upon the Petitioner, the Movant.

Dec. 14, 1965 D. J. GRIBBLE ETAL 3,223,070

DAIRY ESTABLISHMENT

Filed Nov. 5, 1963 3 Sheets-Sheet 1



DONALD JOSEPH GRIBBLE
HENRY E BENNETT
INVENTORS.

BY Ramsey, Kolisch & Hartwell
ATTORNEYS

Dec. 14, 1965 D. J. GRIBBLE ETAL 3,223,070

DAIRY ESTABLISHMENT

Filed Nov. 5, 1963 3 Sheets-Sheet 2

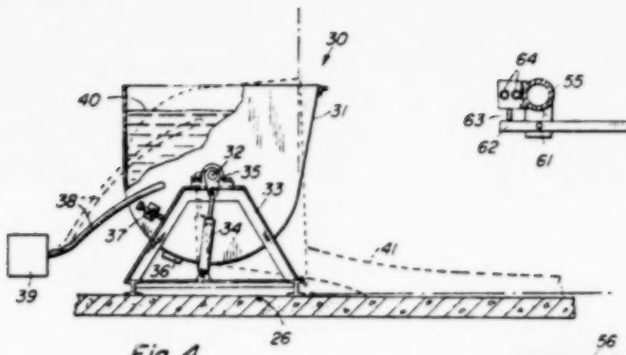


Fig. 4

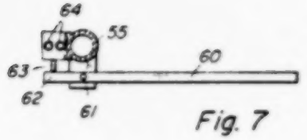


Fig. 7

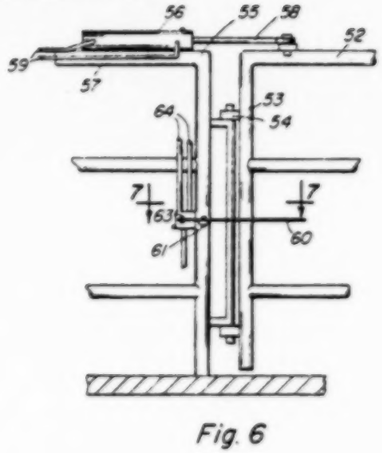


Fig. 8

Fig. 6

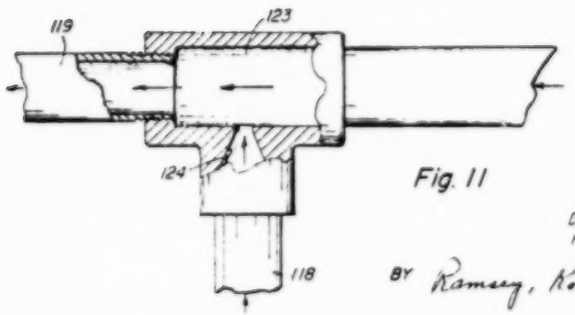


Fig. 11

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Dec. 14, 1965 D. J. GRIBBLE ETAL 3,223,070

DAIRY ESTABLISHMENT

Filed Nov. 5, 1963 3 Sheets-Sheet 3

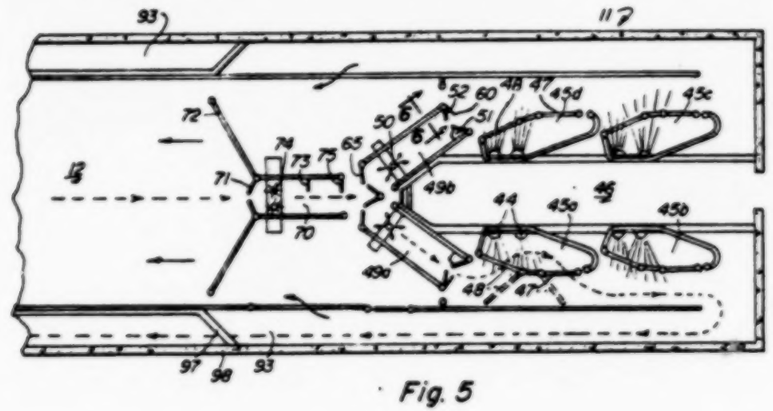

Fig. 5

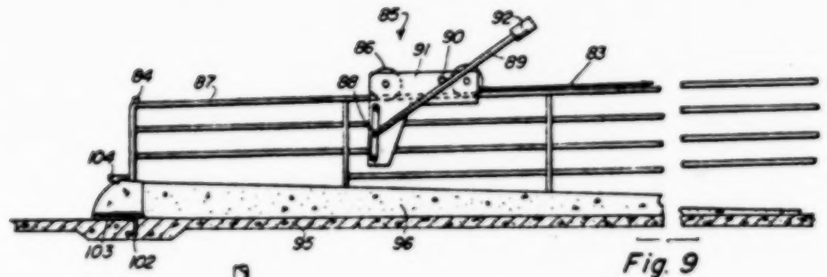

Fig. 9

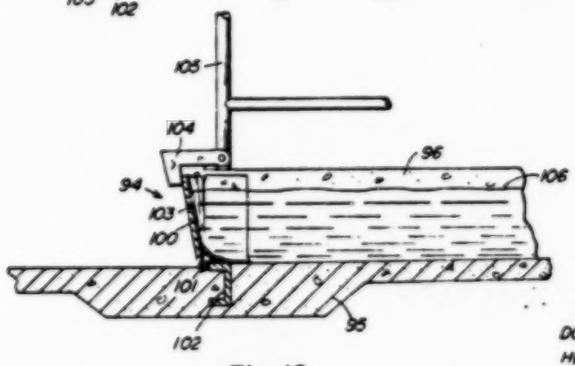

Fig. 10

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United States Patent Office 3,223,070 Patented Dec. 14, 1965

3,223,070

DAIRY ESTABLISHMENT

Donald Joseph Gribble and Henry E. Bennett, Santa Rosa, Calif., assignors to AG Pro Inc., Santa Rosa, Calif., a corporation of California

Filed Nov. 5, 1963, Ser. No. 321,642
3 Claims. (Cl. 119—16)

This invention relates to method and equipment for care and maintenance of domesticated food-producing animals. While the invention is particularly applicable to the care and maintenance of milk-producing cows, and will be described in relation to the construction of a dairy barn and care of cows, it is applicable to other domesticated animals.

Ever since man domesticated animals, their care and maintenance has involved a great amount of hand labor, particularly in the case of milk-producing animals such as cows which are kept for periods of time in a barn. It is recognized today that in order to achieve optimum results in milk production, cows must be properly fed and cared for and milked under strictly sanitary conditions. The removal of cow offal from a barn is as much of a task today as it was in ancient times. In order to produce good, sweet milk, it is important that there be no accumulations of cow manure and urine in the barn because milk readily absorbs odors directly as well as through the respiratory system of the cows. Furthermore, accumulations of manure in the usual piles or lagoons employed in connection with dairy operations are obnoxious and highly unsanitary. They are breeding grounds for flies, mosquitoes and all forms of pests as well as a prime source of water contamination. Seepage and runoff from manure accumulations contaminate surface as well as subsurface water supplies. According to a feature of our invention, this is completely eliminated and cow offal is continuously removed from a barn and put into condition for expeditious use as fertilizer.

Under known dairying techniques cows are maintained, when the weather permits, in pastures near the milking barn and are periodically brought into the barn for the purpose of milking and then returned to pasture. Movement of cows between pasture and barn is time consuming and entails considerable man hours. Permitting cows to graze a pasture is not the most efficient way of feeding them. When cows are turned loose in a pasture, they graze it unevenly, trample much of the feed, and the manner in which their manure is deposited on the ground destroys the feed with which it comes in contact and doesn't do the ground much good. Furthermore, flies and other undesirable pests are attracted to the area. From the foregoing, it will be appreciated that a given field will produce more and better feed if the feed is removed therefrom and fed to the cows rather than permitting them to graze.

The object of the present invention is to provide a really completely sanitary dairy system which produces uniformly high-quality milk in greater quantities per cow than heretofore produced at substantially lower cost and with much greater ease to the producer.

The object of the invention is achieved by maintaining a herd of dairy cows under controlled, sanitary conditions. Pasturing of cows is completely eliminated. The cows are maintained in a large barn having various areas in which the cows rest, eat, and are milked on a controlled cyclical schedule. Cows are known to be creatures of habit and they readily adapt themselves to moving at the desired times from one area to another. Substantial hand labor and man hours are eliminated by keeping the cows relatively confined and the quantity and quality of their milk is markedly enhanced.

According to a feature of the present invention, the areas in which the cows are confined are so constructed that they can be periodically flushed clean by water which is collected and utilized thereafter. Some of the waste products which accumulate on the floor of a dairy barn are manure, urine, feed, stall bedding material, and milk. All of this waste is removed by the flushing water and formed into a fertilizer slurry which may be applied by suitable sprinkler irrigation mechanism to the fields surrounding the barn. The slurry is diluted to an extent that there is no objectionable odor and flies and other pests are not attracted. There is little fertilizer value loss because the slurry is applied while still relatively fresh to the soil in a condition in which it can be easily absorbed. An application of slurry to a field may be followed by an application of clear water which will wash out the sprinkler system and clean the foliage in a field. Much greater soil productivity is thereby achieved and feed, as well as other agricultural products, can be produced in greater and better quantity. If desirable, it is also possible to transport the slurry by tank cars or trucks to locations remote from the barn for use as fertilizer.

According to a feature of the invention, the areas over which the cows are free to roam in the barn are of a hard-paved surface, such as concrete, and are on a slight angle so as to permit drainage in a desired direction into collecting tanks. Water-dispensing means are so constructed and positioned that they can be automatically actuated at predetermined times to release relatively large quantities of water for washing the barn floors. The wash water is collected for subsequent fertilizer use, as previously mentioned.

According to another feature of the invention, the rest stalls of the cows are constructed so that a cow's body can comfortably fit in the stall, but cow offal is deposited outside the stall on the concrete floor which is flushed.

According to still another feature of the invention, just before a cow moves into milking position, the cow's udder and surrounding areas, such as flanks and lower rear legs are washed clean. The cow is also stimulated for easier and quicker milking. In this process, the cow's udder is subjected to a spray of warm water and thereafter primed for milking. This stimulates the cow to let her milk down and immediately thereafter the cow is milked. A cow which is milked according to the method of the invention not only produces more and better milk, but udder damage and mastitis are materially reduced and the period of time over which a cow will be productive is increased.

According to still another feature of the invention, the cows just prior to milking pass through a series of stalls having gates which are operated by the movement of the cows whereby each cow will be in a milking station at a desired time and in optimum milking condition.

These and other features of the invention will be explained in greater detail in conjunction with the drawings, in which:

FIG. 1 is a schematic top plan view of a dairy installation in accordance with the present invention;

FIG. 2 is a section on the lines 2—2 of FIG. 1, showing cows standing in resting stalls;

FIG. 3 is a top plan view of a cow lying down in a resting stall;

FIG. 4 is a side elevation of a water-dispensing dump tank according to the invention;

FIG. 5 is an enlarged top plan view of the milking area of the barn of FIG. 1;

FIG. 6 is a section on lines 6—6 of FIG. 5, showing a gate;

FIG. 7 is a section on lines 7—7 of FIG. 6, showing mounting of control rod and gate;

FIG. 8 is a top plan view of a portion of the front gate and spray-washing mechanism of the washing stall of FIG. 5;

FIG. 9 is a side elevation partly in section of a portion of the cow holding area, dam in lowered position, and crowding mechanism;

FIG. 10 is an enlarged side elevation partly in section of a portion of FIG. 9, showing the dam in raised position; and

FIG. 11 is an enlarged side elevation partly in section on lines 11—11 of FIG. 10, showing a venturi connection.

Referring to FIG. 1, there is generally indicated at 10 a building enclosure or barn which is divided into various areas. Milking wing 11 has a cow-holding area 12 in which cows are confined just prior to milking. The cows are maintained in groups or units indicated at A, B, C, D in FIG. 1. The cows from a particular group are milked together and the milking times of the various groups may be arranged so as to provide for a convenient schedule of milking the cows and cleansing of the various areas of the barn. Each cow has her own stall 13 within a resting area 14 that corresponds with her particular group. Each resting area opens on to a central transfer or roaming area 15 and feeding areas 16. Gates 15a control movement of the cows from the rest and feeding areas into the transfer area. The cows are not confined to their stalls and are free to move between rest and feeding areas as they desire. This will, of course, usually be when feed is made available to them in the manner about to be described.

Feed-storage silos 17 are connected by suitable mechanically driven and controlled conveyer means 18 to feed troughs 19 in feeding areas 16. Mechanism 18 may be adjusted to deliver the amount, type, and frequency of feed desired to troughs 19. If desired, each silo can be filled with a different type of feed which is metered in predetermined amounts to the automatic conveyer mechanism which deposits it in the feed trough where it is freely accessible to the cows.

It will be appreciated that the number of groups of cows, as well as the number of cows in each group, can be varied and the construction of the barn will be appropriately adjusted.

All of the floor area of the barn over which cows are permitted to walk is covered by a relatively smooth, hard surface, such as concrete, which will satisfactorily withstand repeated washings. The floors are sloped so as to permit drainage towards grate 20 of a fertilizer recovery and utilization system, generally indicated at 21. A uniform slope of the barn floors at a rate of around three feet per hundred feet has been found to be satisfactory.

As best seen in FIGS. 2 and 3, each of the cow-resting stalls 13 is defined by a front wall 22, side-dividing and cross members 23, 24, and floor 25 which is raised above the level of alley floor 26. The length and width of a stall 13 is such that a milking cow of a particular breed can comfortably accommodate herself in a stall in either standing or lying position. Commercially operated dairies usually milk only cows of a particular breed whose sizes do not vary materially. However, if for any reason it is necessary to accommodate cows of varying sizes and dimensions, the stalls can be varied by use of a movable neckboard 28 on sloped guide rails 29 whereby the board may be adjusted depending on the length and height of a particular cow. The important consideration in either case is that the size of the stall is such that all cow offal falls outside the stall and is deposited in alley 26, which is sloped as previously mentioned. The cows are prevented from turning in their stalls and their bedding 27 remains clean and dry and off of the floor areas subjected to water flushing, as hereinafter described.

At the uphill end of each alley 26, means for releasing a relatively large amount of water to flush the alleys clean are provided. The water-releasing means may conveniently take the form of dump tanks 30 (FIG. 4),

comprising a large water-holding container 31 pivotally supported at either end on stub shafts 32 suitably mounted on frames 33 resting on alley floor 26. Shock absorbers 34 are connected by cranks 35 to shafts 32. Counterweight 36 is mounted on the back side of container 31. Adjustable return stops 37 are mounted on either end of container 31 and adapted to engage the frame 33 to position the tank in upright position. Water-inlet hose 38 is connected at one end to the tank and at another end to water-control means 39, which may be adjusted depending on the desired rate of water flow in the tank. When container 31 is filled above line 40, the tank tips forward and dumps a sheet of water 41 on the floor. The empty tank is returned to upright position by the counterweight for refilling. It will be appreciated that a tank may be adjusted automatically to release desired amounts of flushing water on a cyclical basis, such as every four hours.

Turning now to the milking wing, as seen best in FIGS. 1 and 5, four milking station stalls 45a, 45b, 45c, 45d are positioned around a pit 46. Inside the pit an operator stands and applies connections from the automatic milking machines (not shown) to the cows. Each milking stall has a pair of air-operated gates 47, 48 which are controlled by the operator through suitable control mechanism (not shown). When operated, the gates swing open to a position shown in dotted lines in FIG. 5, permitting a cow which has been milked to leave the stall and the next cow to be milked to enter the stall. Water sprays 44 continuously spray water on the floor in the milking stalls in order continuously to remove spilled milk and any cow offal. Immediately behind milking stalls 45a and 45d there are two milk stimulation stalls 49a, 49b, each having sprays 50 for directing warm water or warm drying air against the udder and surrounding areas of a cow standing in the stall. A feed box 51 is provided at the forward end of each stimulation stall into which, through automatic means (not shown), a predetermined amount of feed is placed in the box each time a cow comes in the stall.

Referring to FIGS. 6 and 7, there will be explained the construction and operation of gate 52 in stall 49b which is similar to the other air-operated gates employed in the other stalls in the milking area. Post 53 of gate 52 is hinged at 54 to post 55 of the stall. Cylinder 56 mounted on rail 57 is connected by piston 58 to gate 52. Air lines 59 are connected at one end to cylinder 56 and at the other end (not shown) to actuating means controlled by opening of gates 47, 48 of milking stalls 45c, 45d, whereby when one of those milking stalls is free, gate 52 opens and a cow within stall 49b is free to enter the open milking stall. Control rod 60 is pivotally mounted at 61 on post 55 at the front of the stall and operated by the cow as she leaves the stall. Back end 62 of rod 60 is adapted to engage plunger 63 of air lines 64 which control closing of gate 52 behind the cow and opens a gate 65 permitting a cow to pass from washing stall 70 into whichever of stalls 49a or 49b is open.

A cow enters washing stall 70 through gates 71 flanked by guide rails 72 when the gates are opened under control of gate 48 of a milking stall opening. As a cow moves into stall 70, she engages a control rod 73 in the stall that actuates spray heads 74 positioned in the floor of the stall to eject a spray of water that will wash the udder and surrounding areas of the cow standing in the stall. Heads 74 are turned off when gate 75 of the stall opens to permit a cow to leave the washing stall.

Referring to FIG. 8, mechanism for controlling spray heads 74 is shown. Cylinder 76 is mounted on post 77 of the stall. Piston 78 of the cylinder is connected at 79 to gate 75. Operation of piston 78 is by air lines 80 which are controlled by opening of gates 65. When gate 75 is in closed position shown in dotted lines, it engages plunger 81 permitting water to pass through conduit 82

to heads 74. Opening of gate 75 disengages plunger 81 and shuts off water to heads 74.

When the cows are ready for milking, they will naturally congregate in the milking area. In order to expedite their movement through the milking stations and segregate the cows who are to be milked, there is provided in holding area 12 which leads into the milking area, a crowding device generally indicated at 85 (FIG. 9) one-half of which is shown, the other half being the same. Rollers 86 ride along top rail 87 on either side of the holding area. Transverse rails 88 extend between each half of the crowding device and are connected to one end of lever 89 which is pivotally mounted at 90 to side plate 91 hanging from wheels 86. A weight 92 is provided at the other end of lever 89. When the lever is pushed down, rails 88 are swung up permitting cows to pass underneath. When the cows are all inside the rails, they are lowered and as it is desired to move cows through holding area 12 in the direction of dashed arrow lines (FIG. 5), the crowding device is moved forwardly in the direction of the solid arrow (FIG. 9) by pulling cable 83. A stop 84 is positioned at the end of rail 87 to limit backward movement of the crowding device. The cows will one at a time then proceed through the washing, milk stimulation, and milking stalls in the direction of the dotted arrows (FIG. 5). Once a cow has been milked, she will leave the milking area of her own volition down cow-return alleys 93 to area 15, and to her stall or feeding area. The system of gates and rails will prevent her from mingling with cows in the holding area awaiting milking.

Near the juncture of holding area 12 and transfer-roaming area 15, a dam 94 is provided for controlling flow of flushing water from the milking area. Floor 95 of the milking area slopes into area 15 which slopes toward grate 20 at about a pitch of 3' in 100'. Water-retaining walls 96 extend along either side of the holding area. Wings 97 extend from one end of walls 96 to side walls 98 of the milking wing and dam 94 extends between the other two ends of the water-retaining walls. The dam comprises a steel plate 100 (FIGS. 9, 10) which at 101 is hinged to a channel iron 102 embedded in floor 95. A sheet of tough rubber-like material 103 prevents leakage of water between the plate and channel and along the sides when the dam is raised as shown in FIG. 10. A catch 104 on post 105 holds the dam closed when it is in raised position. When the catch is released, the dam is free to fall flat on the floor, as shown in FIG. 9. It is in the latter position while a group of cows are passing into the holding area preparatory to milking. Once all the cows are confined in area 12, the dam is raised to retain flushing water coming in the milking area. Water behind the dam may rise up to line 106. After a group of cows have been milked, dam 94 is dropped and a relatively large volume of water is released into area 15 which is thereby cleansed.

It will be seen from the foregoing that all of the water which is used to flush the floors of the barn drains toward grate 20 which is so constructed as to permit the water and entrapped offal to collect in tank 110 of the fertilizer recovery and utilization system (FIG. 1). Tank 110 may conveniently be placed underground and an agitator 111 in the tank mixes the water and offal into a slurry. Pump 112 and pipe 113 pass the slurry through a dewatering device 114 from which excess water is removed, and through a grinder 115 which grinds all large solids, feed, rest stall bedding material, etc., to a size small enough to pass through a sprinkler. The resulting slurry is maintained in another storage tank 116 having agitators 111 therein. When fertilizer slurry is desired, pump 117 pumps it from the tank into pipes 118, 119 connected to sprinklers 120 in the fields adjoining the barn. There is also connected to pipe 119 a source of clean water and pump 121 which pumps water under pressure into pressure tank 122.

Referring to FIG. 11, there is shown one way—venturi action—of passing slurry through the sprinkler system. At the juncture of pipes 118, 119 there is a coupling 123 and a restricted orifice 124 in pipe 118. Slurry under pressure passes through orifice 124 where it is mixed with clean water under pressure from tank 122 and moves in the direction of the arrows to the sprinklers. In place of the venturi a high presure centrifugal or other suitable type of pump could be used in the system.

It will be appreciated that the amount and mixture of fertilizer slurry can be controlled as desired. Also, after fertilizer slurry has been deposited in the fields, clean water can be sent through the pipes in order to wash them out and any fertilizer remaining on the foliage. In this way the fertilizer is washed into the ground, and there are no obnoxious odors or attraction for flies and other pests. If, in the winter or at other times, it is not desired to fertilize the adjoining fields, the storage tanks may be emptied into tank cars or the like for transportation of the fertilizer to other areas where it may be utilized.

It will be noted from the foregoing description of the invention that personnel to operate a dairy barn have been greatly reduced from that normally employed and that the cows to a great extent have been left free to move of their own volition. It has been found that cows are creatures of habit and learn a routine quickly, particularly where it is to their comfort and advantage. Cows therefore lend themselves readily to the desired cyclical movements from one area to another at the desired times with a minimum of human effort.

While the system has been explained with respect to specific embodiments of the invention, it will be appreciated by those skilled in the art that various changes may be made in the construction without departing from the scope of the invention as defined in the appended claims.

It is claimed and desired to secure by Letters Patent:

1. A dairy barn for cows and the like including a smooth, evenly contoured paved surface forming a floor providing a walking surface for cows in the barn, drain means for draining wash water from such floor opening to the top of the floor, said smooth, evenly contoured surface which forms such floor sloping toward said drain means whereby wash water discharged on the floor may be collected and disposed of through said drain means, said barn further including multiple rest areas with individual stalls for each cow and with each of said stalls having a bottom which is also of smooth pavement, but which is disposed at an elevation above the paved surface forming the floor, said stalls being dimensioned so that a cow can comfortably stand or lie in the stall, but offal from the cow falls outside the stall bottom and onto the floor providing the walking surface in the barn, said barn further including defined feeding areas having feeding troughs with means for discharging feed to the troughs, a cow-holding area, a milking area and a transfer area all bottomed with the walking surface forming said floor in the barn, and floor-washing means for washing the floor providing the walking surface in the barn where said floor bottoms said feeding, holding, milking and transfer areas operable to send wash water flowing over the floor with such water washing any cow offal thereon into said drain means, said floor-washing means including means located over a region of said floor which is uphill from said drain means constructed to collect water as a pool above said floor and operable after such collection of water as a pool to disperse the water as a sheet of water over said floor.

2. The barn of claim 1, wherein said floor-washing means comprises a water dump tank disposed above the floor, and a mounting for the tank including means whereby the same may be tipped thereby to allow the contents of the tank to escape abruptly from adjacent the top of the tank and to cascade onto the floor to form a sheet of water thereon.

3. The barn of claim 1, wherein said floor-washing means comprises a dam for damming and collecting water as a pool directly on the floor, and such dam is abruptly openable to send such water as a sheet over the floor toward said drain means.

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HUGH R. CHAMBLEE, ALDRICH F. MEDBERY, *Examiners.*

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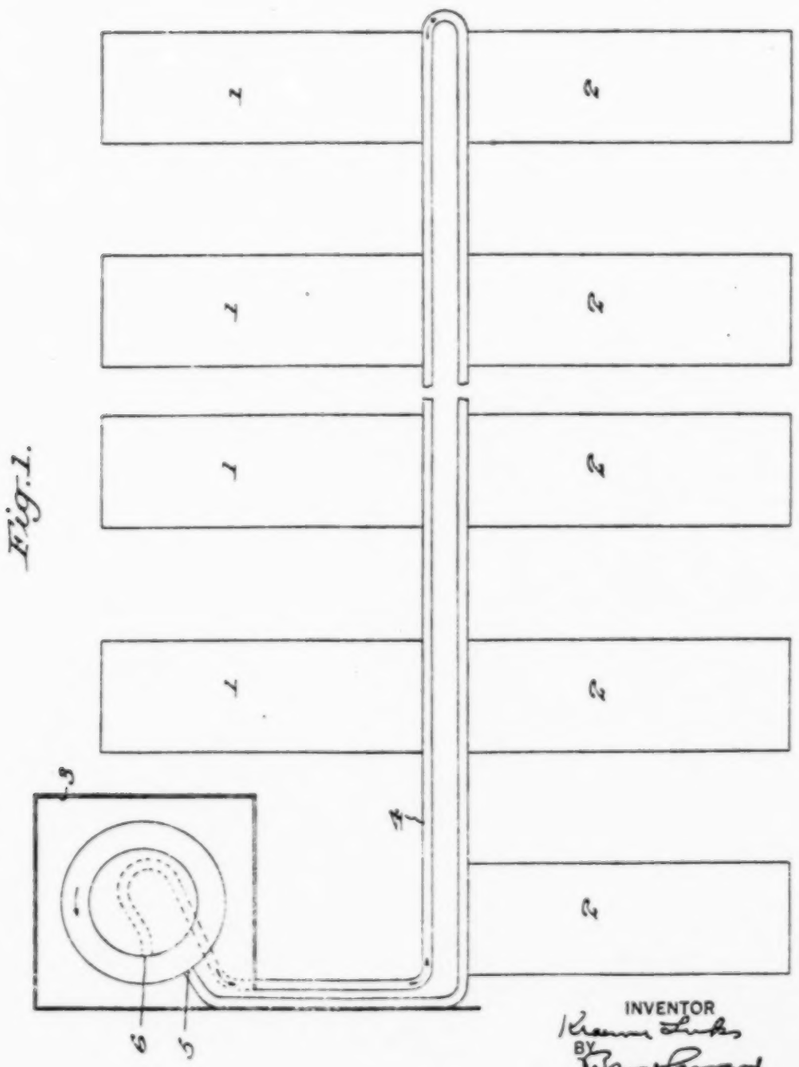
July 31, 1934. K. LUKS 1,968,564

MILKING APPARATUS

Filed March 17, 1928 4 Sheets-Sheet 1

Fig. 1.



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MILKING APPARATUS

Filed March 17, 1928 4 Sheets-Sheet 2

Fig. 2.

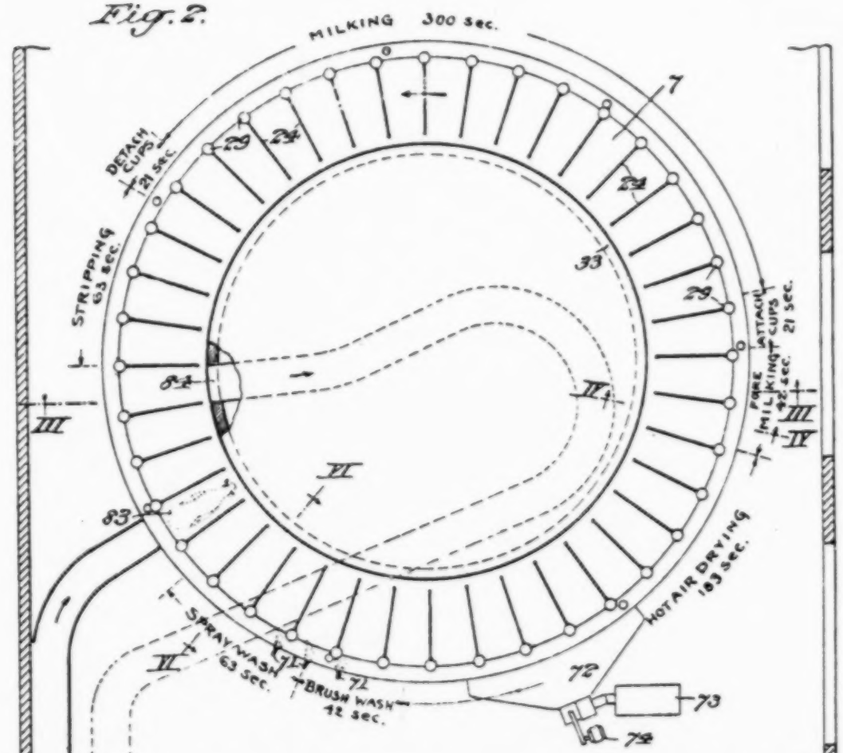
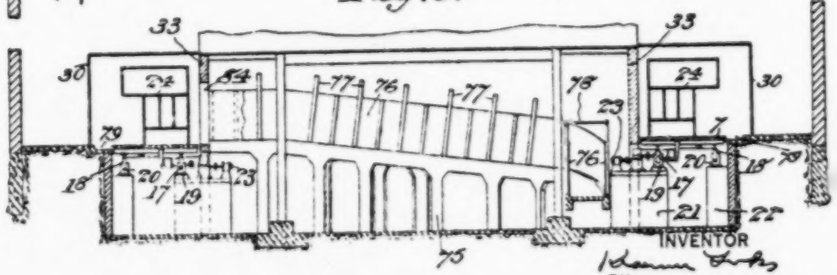


Fig. 3.



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MILKING APPARATUS

Filed March 17, 1928 4 Sheets-Sheet 3

Fig. 4.

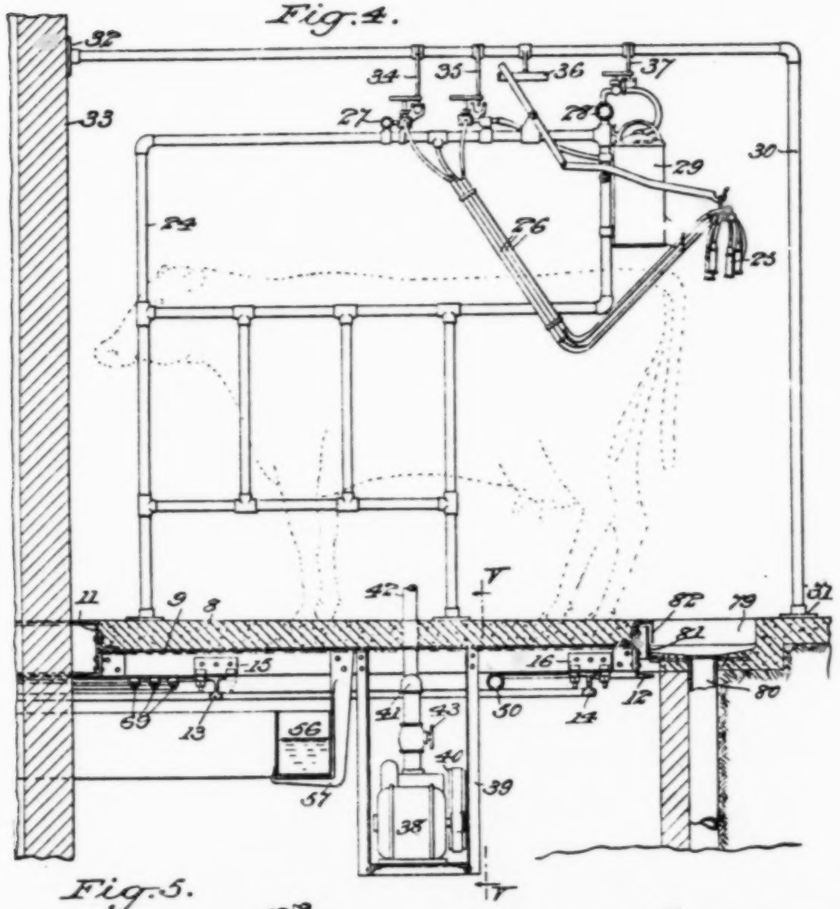
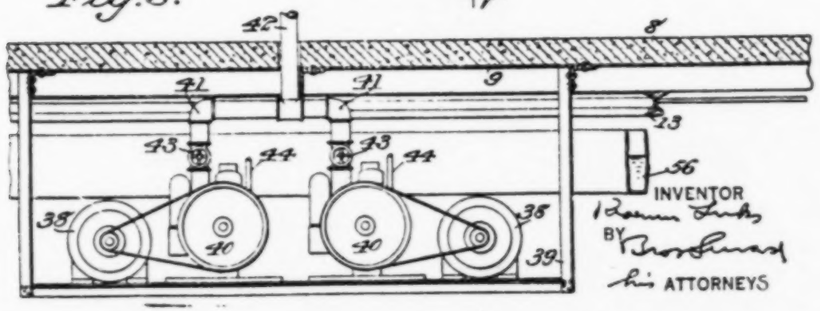


Fig. 5.



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July 31, 1934. K. LUKS 1,968,564

MILKING APPARATUS

Filed March 17, 1928 4 Sheets-Sheet 4

Fig. 6.

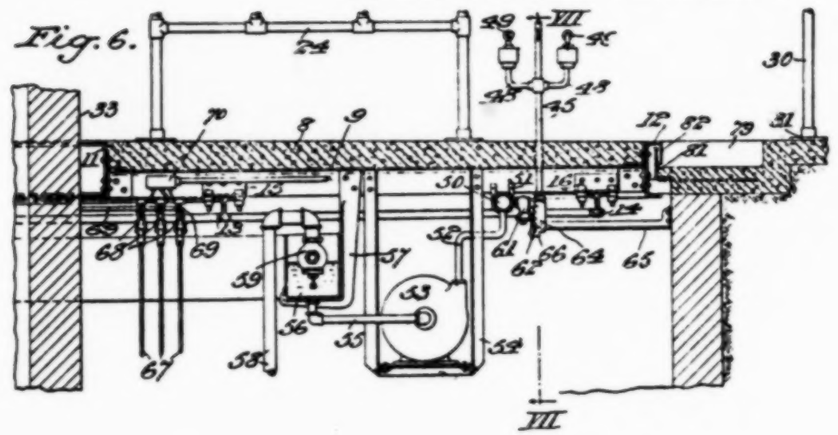
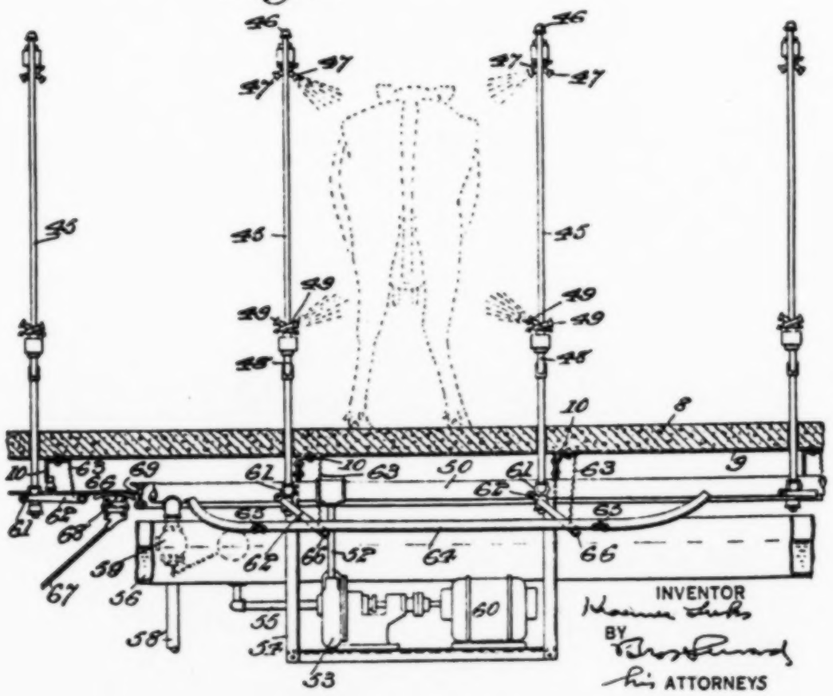


Fig. 7.



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Patented July 31, 1934 1,968,564

UNITED STATES PATENT OFFICE

1,968,564

MILKING APPARATUS

Kraemer Luks, Towaco, N. J., assignor, by mesne assignments, to Walker-Gordon Laboratory Company, Inc., Plainsboro, N. J., a corporation of Delaware

Application March 17, 1928, Serial No. 262,389

21 Claims. (Cl. 31—58)

This invention relates to apparatus for milking cows and contemplates the provision of means whereby a system may be established for the movement of animals seriatim from their barns and for subjecting them in sequence to all the operations incidental to hygienic milking while the cows are traveling on a moving platform.

Another object is to provide means whereby the cows file from their barns, walk successively into position on a moving platform, remain in said position on the platform during all the operations, and then successively step off the platform upon arriving at a given position and file back to their barns.

Another object consists in providing such an apparatus in which the traveling platform moves in an endless path, supports devices for performing certain of the operations, and successively passes stations at which are located devices appropriate for the performance of others of the operations, the said devices being arranged in such sequence as to require the correct succession of the operations, and being located at such distances apart as to allow the correct amount of time for each operation before any given animal reaches the succeeding station.

Another object consists in providing such an apparatus in which the moving platform is annular in form and the stations for certain of the operating devices are located around its outside circumference, while its inner circumference is employed for the exit of the animals and for the location of any such complementary structure as may be desirable. This arrangement allows adequate room for the operating devices because the outside circumference is, of course, much greater than the inside, and it also facilitates the said operations because of the relatively slow linear speed of the outside circumference at any given R. P. M.

Another object is to provide such an apparatus which has the capacity for handling a large number of animals and yet is comparatively compact and simple in construction.

Another object consists in providing such an apparatus in which suitable relatively movable connections are established between the parts of the operating devices on the moving platform and the parts on immovable supports surrounding the platform so as to enable proper cooperative functioning of the said parts.

A further object consists in providing certain improvements in the form, construction and arrangement of the several parts of the apparatus whereby the above named and other objects may effectively be attained.

A practical embodiment of the invention is shown in the accompanying drawings, in which

Fig. 1 represents a broken diagrammatic view of a plant, illustrating a location of the cow barns and the milking apparatus suitable for carrying out the desired system.

Fig. 2 represents a diagrammatic view of the moving platform and certain connected parts.

Fig. 3 represents a section taken in the plane of the line III—III of Fig. 2, looking in the direction of the arrows, and including certain parts not shown in Fig. 2.

Fig. 4 represents an enlarged detail section taken substantially in the plane of the line IV—IV of Fig. 2 looking in the direction of the arrows.

Fig. 5 represents a detail section taken in the plane of the line V—V of Fig. 4 looking in the direction of the arrows.

Fig. 6 represents an enlarged detail section, on the same scale as Fig. 4, taken substantially in the plane of the line VI—VI of Fig. 2 looking in the direction of the arrows.

Fig. 7 represents a section taken in the plane of the line VII—VII of Fig. 6, looking in the direction of the arrows, and showing certain parts more completely.

The general system followed in the individual application of my invention may be a matter of substantial importance and, in order better to visualize the same, reference may be had to Fig. 1 in which the general lay-out is diagrammatically represented. Two series of barns are marked 1, 2. The building in which my improved apparatus may be housed is indicated by 3, and an endless walkway for the cows is marked 4. This walkway is arranged so as to meet with the upper level of the apparatus at the ingress point denoted by 5, and to leave on the same level at the egress point marked 6, and then be depressed and pass under the apparatus, as indicated in dotted lines, until it rejoins the main walkway at the normal level thereof. The arrows on the walkway denote the path of travel of the animals, and it will, of course, be understood that they file in sequence from the barns 1 and 2 for the milking operation, and return to the same thereafter, in accordance with the predetermined system under which the plant is operated.

The moving platform is denoted generally by 7, and it preferably takes the form of an annulus fitted to be supported in a suitable depression formed in the foundations of the building for housing the apparatus. The said platform or

turntable may have a cementitious surface 8 supported on metallic or other suitable flooring 9 carried by angle iron or other appropriate beams 10. The said beams 10 are radially disposed at suitable intervals around the platform 7 and their inner and outer ends are riveted to and supported by channel girders 11, 12, that are suitably curved so as to conform to the shape of the platform.

A pair of concentric rails or tracks 13, 14, are secured to the under sides of the beams 10 by suitable clamping devices 15, 16, and the said rails are designed to rest upon two concentric series of wheels 17, 18, (see Fig. 3) which are properly mounted in order to constitute means for supporting and permitting rotary travel of the platform 7. The said rails may be ordinary railroad rails and the wheels similar to railroad car wheels.

Series of journals 19, 20, carry the wheels 17, 18 and are themselves mounted on supports 21, 22, which may conveniently be composed of reinforced concrete.

Two of the wheels 17, preferably diametrically opposed, are positively driven from motors 23, through suitable connections of conventional form. The driving of the said wheels 17 serves to rotate the platform 7 at desired speed. I find a peripheral speed of the outside circumference of the platform amounting to twelve feet per minute to be satisfactory.

In order to prevent slippage between the wheels and rail in the drive, it is desirable to have the journals 19 yieldingly mounted in any well known or approved form. Such mounting may also be provided for the journals 20 that carry the wheels 18, if desired.

The upper surface of the platform 7 has a series of radially disposed divisions which are marked 24. In the present instance 40 of these are shown, and they may conveniently be composed of hollow iron piping suitably fixed on the cementitious surface 8. The said devices are spaced apart at such distance as to establish between each contiguous pair a stall for a cow, so that forty cows can be accommodated at one time on the platform. It will, of course, be clear that this number may be increased or decreased by varying the size of the apparatus.

Each of the said devices 24 constitutes a means of support for a suitable milking machine intended to be operative during a portion of the time the animals are being transported on the platform. The said milking machine is illustrated in Fig. 4 of the drawings but, as it constitutes no part of my invention and is described in a copending application of Cyrus H. Hapgood, Serial Number 262,337 filed of even date herewith, the same will not be herein described other than to note that the teat cups are indicated by 25, the connecting tubes for operating them by 26, a pulsator pipe by 27, a vacuum pipe by 28, and the milk pail by 29.

The apparatus also includes a series of iron piping frames 30 which have their outer ends mounted on the foundation exterior to the platform, as indicated at 31, and their inner ends fastened, as at 32, to a wall 33, or other structure located within the inner circumference of the platform. The said frames 30 are suitably positioned and are calculated to carry actuating devices 34, 35, 36, 37, for the milking machines, all as shown and described in said co-pending application of Cyrus H. Hapgood. As these arrangements constitute no part of my invention, they will not be further described herein.

In order to provide power for the actuation of the milking machine, a pair of motors 38, 38, are carried in an angle iron sling 39 fast to the under side of the platform 7. Each of said motors drives a combined exhaust pump and pulsator 40, 40, the said exhaust pumps being connected by branch piping 41 to a main pipe 42 which is connected in any practicable way with the vacuum pipe 28 of the milking machine. It is intended to use only one of the motors and connected devices at a time, the second being supplied in order to eliminate interruption in the operation in case of breakdown. Valves 43, 43, in the branch pipes 41, 41, enable either exhaust pump to be connected with the main pipe 42. Pipe extensions 44, 44, from the pulsators, may be united with a single pipe that is connected with the pulsator pipe 27 in a manner similar to the vacuum pipe just described, or in any other well known or approved way.

The apparatus further comprises means for washing each animal after it takes its position on the traveling platform and before milking operation begins. This means consists of a series of stand pipes 45 which are coincident with the devices 24 and located near the outer circumference of the platform. Each stand pipe has an overhanging spray head 46 with a pair of nozzles 47, and a lower spray head 48 with a pair of nozzles 49. The said pipes are connected at their lower ends with a water main 50 that is circularly formed and carried by straps 51 beneath the radially disposed beams 10. The said water main 50 is supplied with water under pressure through a pipe 52 connected with a pump 53 that is hung in a sling 54 fixed to the under side of the platform. The said pump communicates by a pipe 55 with a circular trough 56 that is carried in brackets 57 bolted or otherwise secured to the beams 10. A supply pipe 58 from a suitable source leads into the trough 56 and the flow of water therefrom into the trough is governed by a float valve 59 similar to the common float valve usually employed in flush tanks. This arrangement provides for maintaining a predetermined level of water in the trough 56 and allows for relative movement of the trough and supply pipe during the rotation of the platform 7. The pump 53 may be driven from a motor 60 mounted in the same sling 54.

The actuation of the spray nozzles 47, 49, is governed by a valve 61, which is provided with a lever 62 normally urged upwardly by a retractile spring 63. A shoe 64 is carried by a bracket 65 fast to the foundation surrounding the platform and provided with upwardly curved ends, as clearly shown in Fig. 7. The said shoe is designed to contact with rollers 66 on the lower ends of the levers 62 and to depress the said levers against the action of the springs 63 in order to open the valves 61 and permit the water to be sprayed from the nozzles 47, 49. The length of the shoe 64 determines the extent of the period of spray.

All the previously mentioned motors are provided with power through three poles 67 that have shoes 68 at their upper ends which run on wire rings 69 carried on the under side of the platform 7, and communicating by suitable connections, generally indicated by 70, with the motors.

It may be desirable to have additional sprays playing upon the rear of the animal, and, to this

end, I have provided three spray heads 71 located on the foundation at a desired point contiguous to the outer periphery of the platform 7. These may be operated manually by any suitable form of valve construction, and serve to contact with portions of the animal not effectively reached by the sprays 47 and 49.

For the purpose of drying the animals following the spraying, a hot air hood 72 supplied from a suitable source of hot air 73 by a blower 74 is located on the foundation at a predetermined point adjacent the outer circumference of the platform 7. The said drying means is represented diagrammatically in Fig. 2 and may be of any well known or approved construction.

The exit walkway for the animals, shown in dotted lines in Fig. 2, is more fully represented, as to its construction, in Fig. 3, and may consist of reinforced concrete supports 75 flanked by walls or rails 76 with occasional uprights 77 having cross heads 78. The walls, of course, guide the animals, and the uprights and cross heads prevent disorder.

The surface immediately exterior to the outer circumference of the platform 7 has a gutter 79 formed therein with drain pipes 80 at intervals for the escape of the wash water and refuse. The said gutter is furnished at its inner edge with an upstanding guard 81 that cooperates with a depending flap 82 on channel beam 12 to prevent any splashing or seepage of the drain water from the gutter into the space beneath the platform.

The diagrammatic view represented in Fig. 2 is marked to indicate the successive operations and the proportional period of time allowed for each. When the apparatus is in use, an animal steps from the walkway 4 onto the traveling platform in the position indicated by the dotted figure of a cow shown at 83 in Fig. 2. The platform is, at that time, moving in the direction of the arrow indicated thereupon. Promptly after the animal reaches this position on the platform, the sprays come into operation and cleanse the animal during the period of time marked "Spray wash" on Fig. 2, which is indicated as being 63 seconds. Following this the animal may be washed with a brush manually for a period of 42 seconds. Thereafter the hot air drying takes place for a period of 183 seconds. When the drying has been completed there is a manual foremilking which is indicated to be completed within 42 seconds. Thereafter the operator attaches the teat cups 25 of the milking machine and is allowed 21 seconds for doing so. The milking machine is intended to be in operation for a period of 300 seconds, and then an operator is allowed 21 seconds for detaching the teat cups. Following this there is a manual stripping in order to complete the milking operation, and this is intended to be accomplished in 63 seconds. At the end of the stripping operation the cow has reached the point of egress into the walkway indicated by dotted lines in Fig. 2, and as this point is reached, the stall in which the animal is standing comes in coincidence with an opening 84 in the wall structure 33 and the cow, as is its wont, immediately steps through the said opening into the walkway.

The description which has just been given with respect to a single animal takes place with each animal in succession, and it will be understood that there is a continuous procession of the cows filing onto the moving platform, into the successive stalls, and off the platform into the walkway. Thus, from the time each cow leaves its barn until it returns thereto, there is a constant movement in a given direction so that the whole purpose is accomplished by systematic progression from the barn through the milking operations and others incidental thereto and back to the barn, without any reversal or confusion of movement. The periods allowed for the various operations are practicable and suitable but they are, of course, variable in accordance with individual judgment and the exigencies of any particular plant. Following the milking step, in any case, the milk pails may be emptied into suitable receptacles and the output from each animal weighed and recorded as described, for instance, in the said co-pending application of Cyrus H. Hapgood.

The disclosure of my invention herein set forth involves, also, a disclosure of other novel subject matter not my invention and which forms subject matter of the said co-pending application of Cyrus H. Hapgood.

It will be understood that various changes may be resorted to in the form, construction and arrangement of the several parts and in the periods of operation without departing from the spirit and scope of my invention; hence, I do not intend to be limited to the details herein shown and described except as they may be included in the claims.

What I claim is:

1. Apparatus designed for milking the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking the animals while on the platform and moving from the point of ingress to the point of egress.

2. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress.

3. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, part of said last named means being carried by the platform and part being mounted adjacent the platform.

4. Apparatus designed for milking the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking the animals while on the platform and moving from the point of ingress to the point of egress, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, and a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform.

5. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, part of said last named means being carried by the platform and part being mounted adjacent the platform, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, and a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform.

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6. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, part of said last named means being carried by the platform and part being mounted adjacent the platform.

7. Apparatus designed for milking the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking the animals while on the platform and moving from the point of ingress to the point of egress, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, and a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform.

8. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, and a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform.

9. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, part of said last named means being carried by the platform and part being mounted adjacent the platform, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, and a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform.

10. Apparatus designed for milking the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking the animals while on the platform and moving from the point of ingress to the point of egress, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, and a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform.

11. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, and a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform.

12. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, part of said last named means being carried by the platform and part being mounted adjacent the platform, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, and a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform.

13. Apparatus designed for milking the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking the animals while on the platform and moving from the point of ingress to the point of egress, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform, and shelters for the animals spaced from the platform and connected in circuit with said walkway.

14. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform, and shelters for the animals spaced from the platform and connected in circuit with said walkway.

15. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, part of said last named means being carried by the platform and part being mounted adjacent the platform, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform, and shelters for the animals spaced from the platform and connected in circuit with said walkway.

16. Apparatus designed for milking the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the in-

gress of the animals to the platform and their egress therefrom, and means for milking the animals while on the platform and moving from the point of ingress to the point of egress, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform, and shelters for the animals spaced from the platform and connected in circuit with said walkway.

17. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform, and shelters for the animals spaced from the platform and connected in circuit with said walkway.

18. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, an endless movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, part of said last named means being carried by the platform and part being mounted adjacent the platform, said point of ingress being at one side of the platform and said point of egress being at the other side of the platform, a walkway leading to the point of ingress and away from the point of egress and passing both over and under the platform, and shelters for the animals spaced from the platform and connected in circuit with said walkway.

19. Apparatus designed for milking and treating the animals of a group in succession, said apparatus comprising, a movable platform, means for actuating the same, means enabling the ingress of the animals to the platform and their egress therefrom, and means for milking and means for treating the animals while on the platform and moving from the point of ingress to the point of egress, said treating means including spraying devices carried on the platform, and means also carried on the platform for supplying liquid under pressure to the said devices.

20. In apparatus of the character described, a movable platform, spraying devices carried on the platform, and means also carried on the platform for supplying liquid under pressure to the said devices, said last named means including a liquid reservoir arranged to cooperate with a source of liquid supply off the platform, and mechanism for drawing liquid from the reservoir and forcing it to the said devices.

21. In apparatus of the character described, a movable platform, spraying devices carried on the platform, and means also carried on the platform for supplying liquid under pressure to the said devices, said last named means including a liquid reservoir arranged to cooperate with a source of liquid supply off the platform, mechanism for drawing liquid from the reservoir and forcing it to the said devices, and means for controlling the level of the liquid in the reservoir.

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METHOD AND APPARATUS FOR STORING AND DISPENSING FEED

Filed Oct. 10, 1932 9 Sheets-Sheet 1

Fig. 1

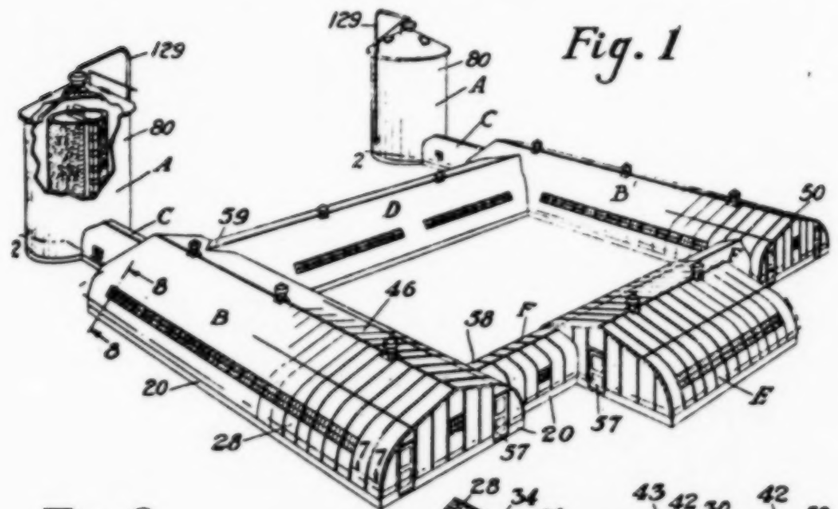

Fig. 2

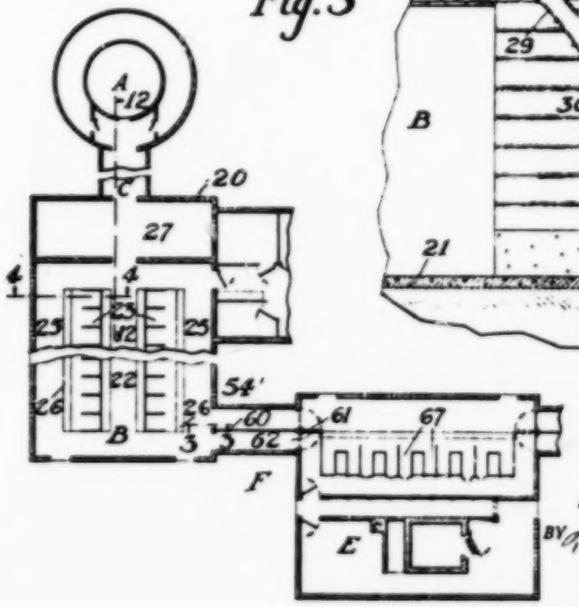

Fig. 3

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Nov. 20, 1934. F. J. KREUTZER 1,981,417

METHOD AND APPARATUS FOR STORING AND DISPENSING FEED

Filed Oct. 10, 1932 9 Sheets-Sheet 2

Fig. 4

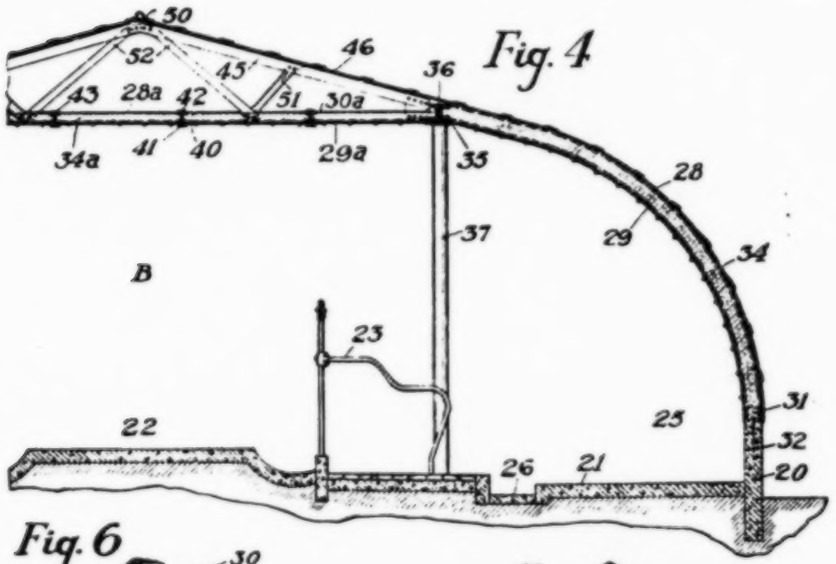


Fig. 6

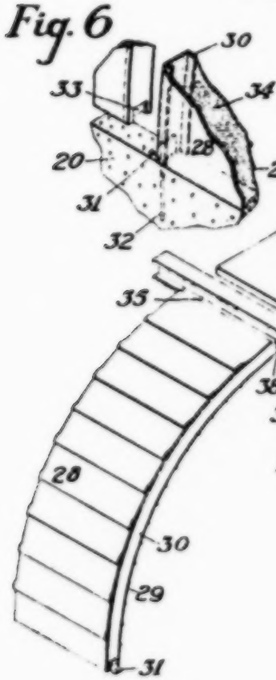


Fig. 5

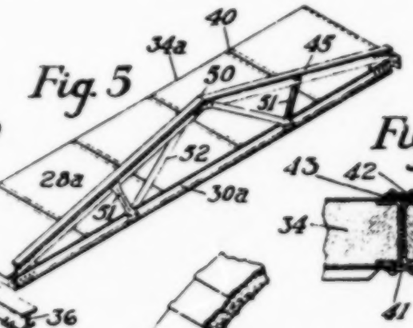


Fig. 7

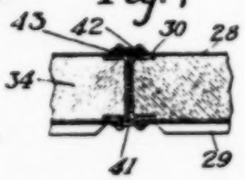
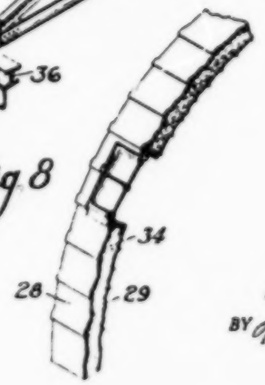


Fig 8



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METHOD AND APPARATUS FOR STORING AND DISPENSING FEED

Filed Oct. 10, 1932 9 Sheets-Sheet 3

Fig. 9

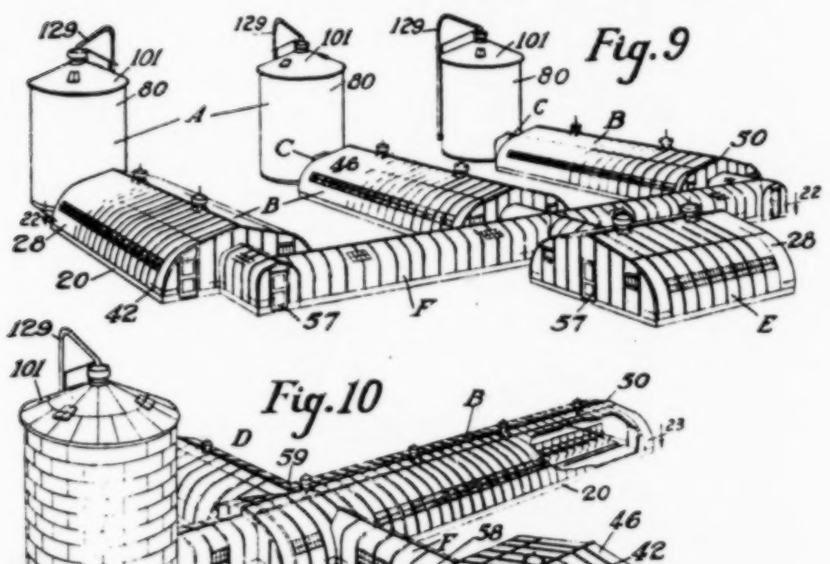


Fig. 10

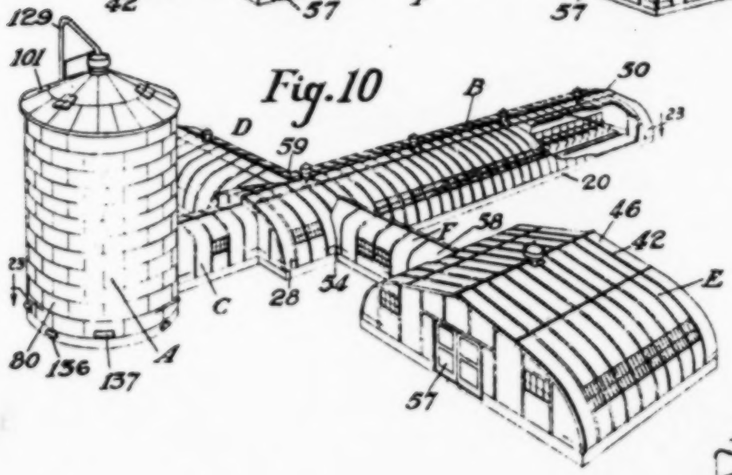
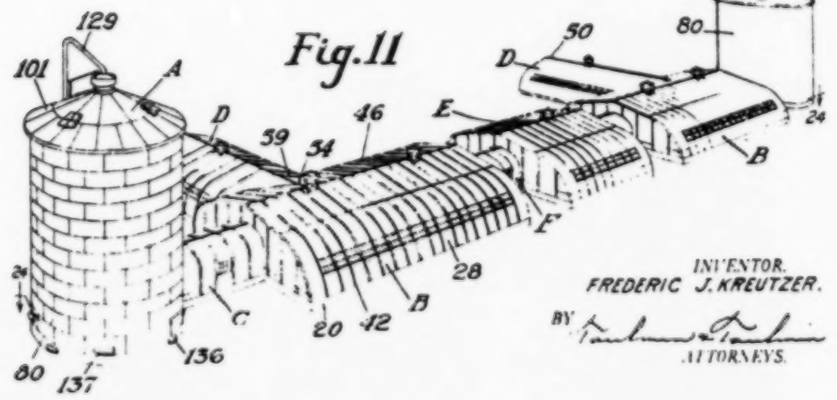


Fig.11



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METHOD AND APPARATUS FOR STORING AND DISPENSING FEED

Filed Oct. 10, 1932 9 Sheets-Sheet 4

Fig. 12

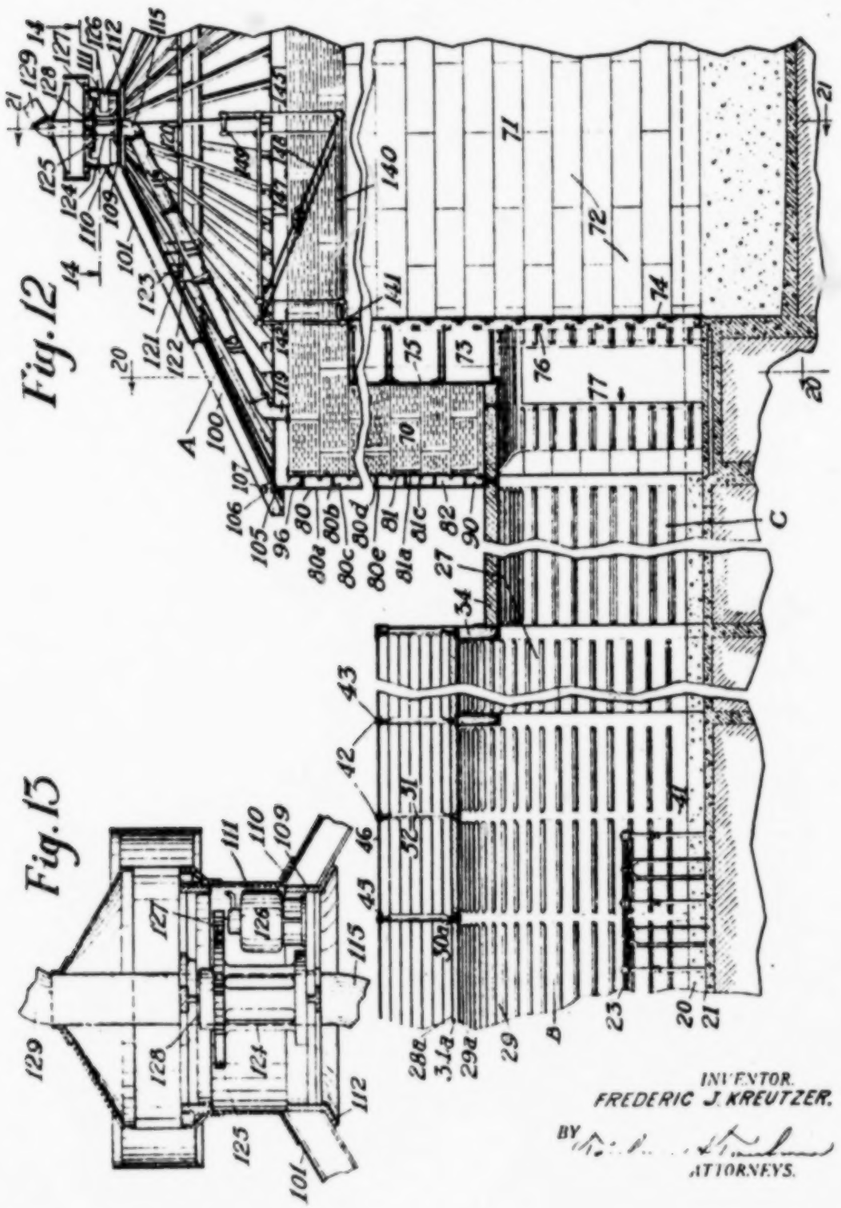

Fig. 13

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METHOD AND APPARATUS FOR STORING AND DISPENSING FEED

Filed Oct. 10, 1932 9 Sheets-Sheet 5

Fig. 14

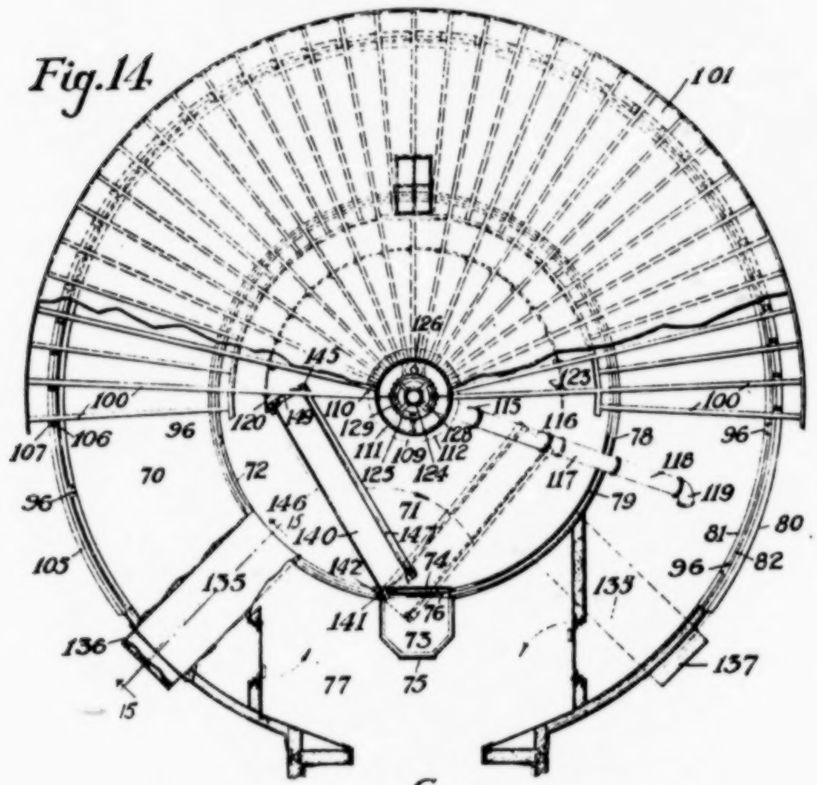
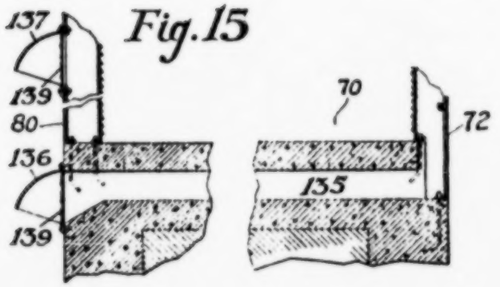


Fig. 15



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Nov. 20, 1934. F. J. KREUTZER 1,981,417

METHOD AND APPARATUS FOR STORING AND DISPENSING FEED

Filed Oct. 10, 1932 9 Sheets-Sheet 6

Fig.16

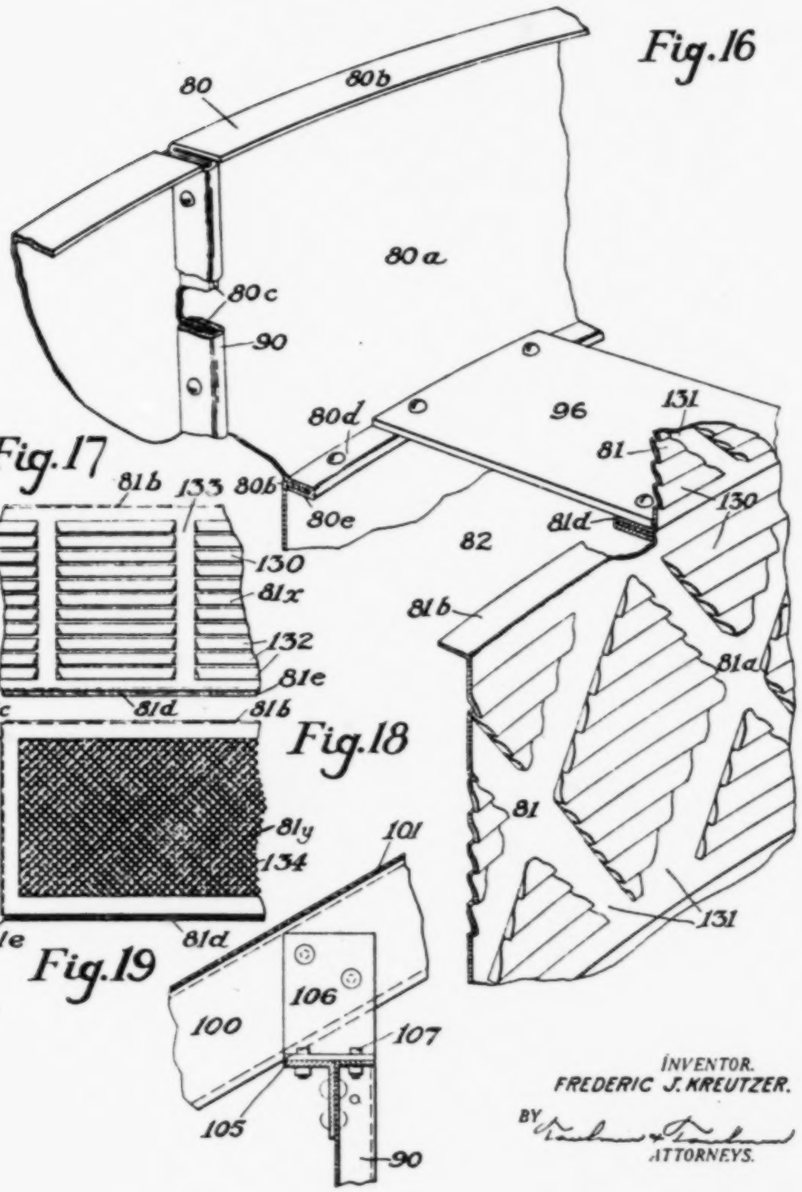

Fig.17

Fig.18

Fig.19

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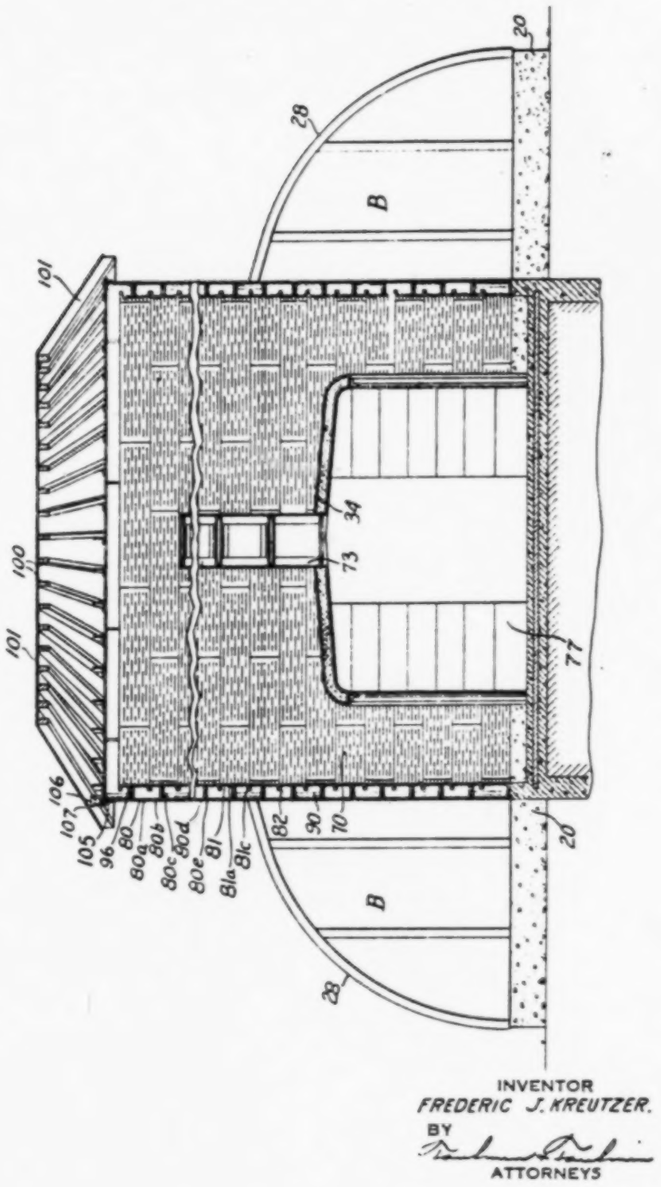
Nov. 20, 1934. F. J. KREUTZER 1,981,417

METHOD AND APPARATUS FOR STORING AND DISPENSING FEED

Filed Oct. 10, 1932 9 Sheets-Sheet 7

Fig.20.



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METHOD AND APPARATUS FOR STORING AND DISPENSING FEED

Filed Oct. 10, 1932 9 Sheets-Sheet 8

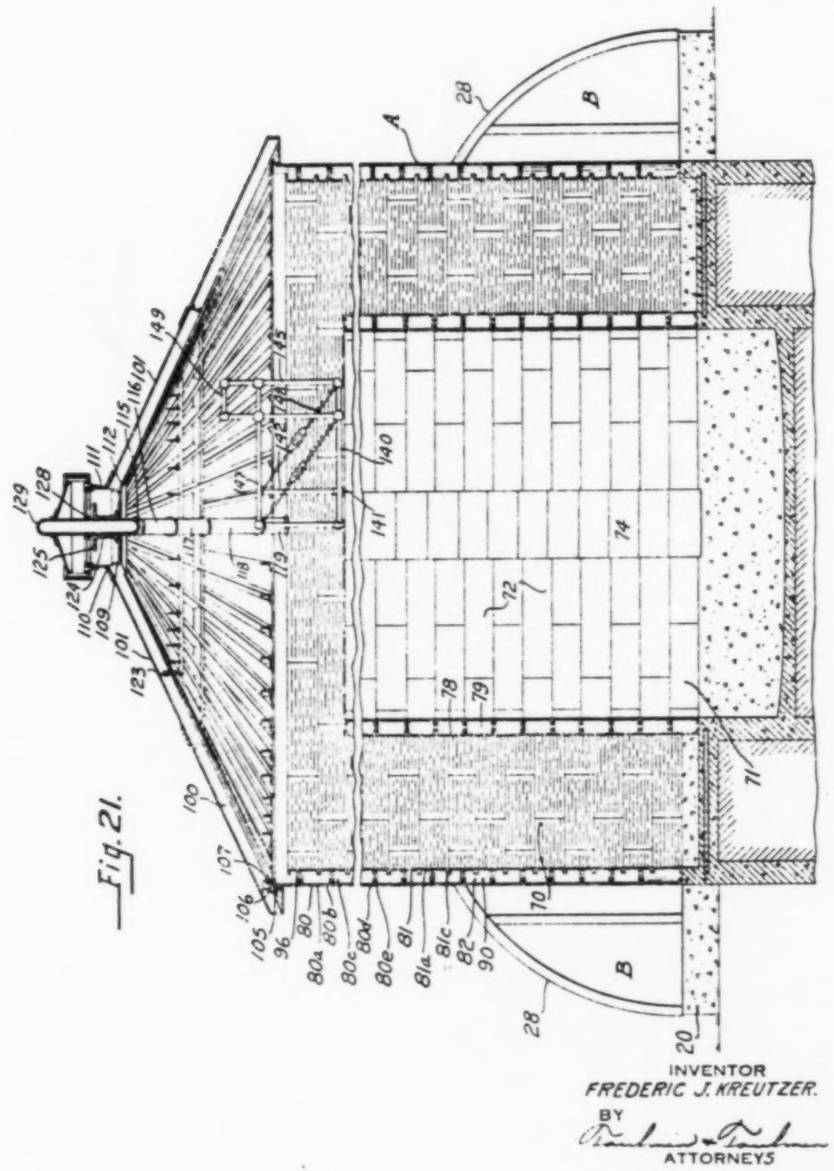

Fig. 21.

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Nov. 20, 1934. F. J. KREUTZER 1,981,417

METHOD AND APPARATUS FOR STORING AND DISPENSING FEED

Filed Oct. 10, 1932 9 Sheets-Sheet 9

Fig. 22.

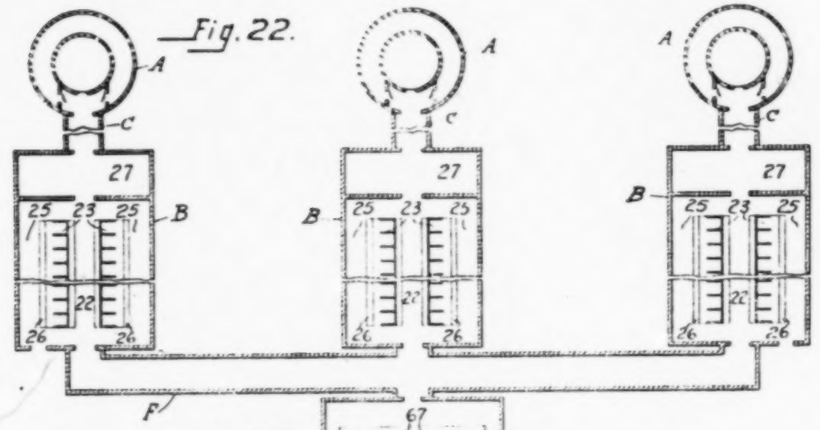


Fig. 23.

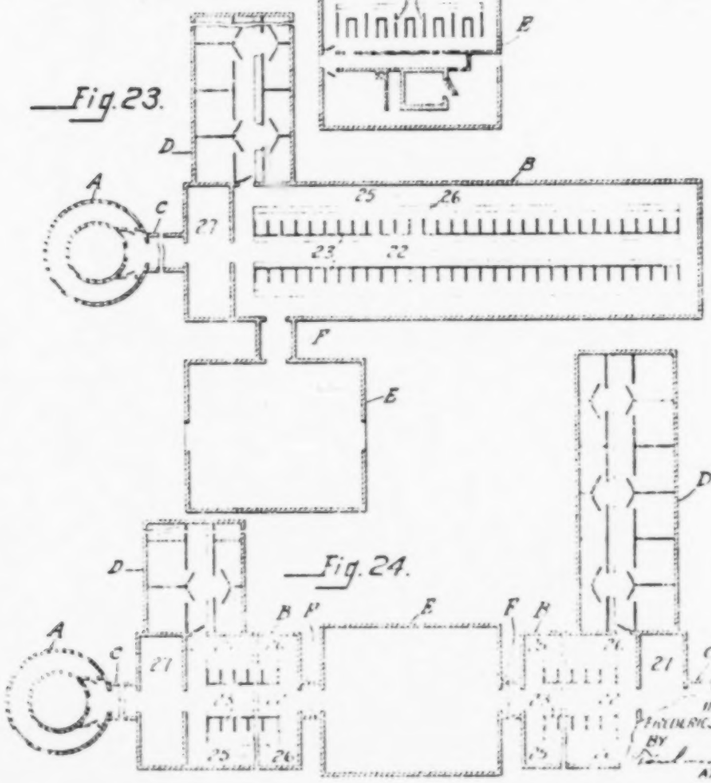
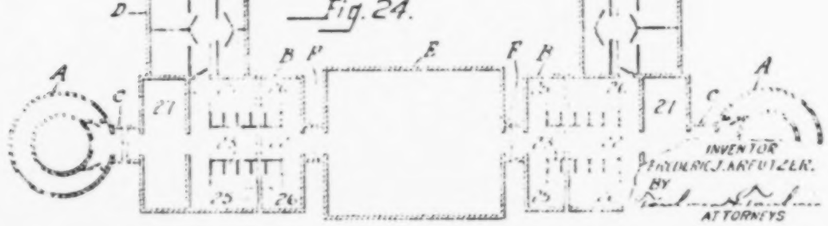


Fig. 24.



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Patented Nov. 20, 1934 1,981,417

UNITED STATES PATENT OFFICE

1,981,417

METHOD AND APPARATUS FOR STORING AND DISPENSING FEED

Frederic J. Kreutzer, Elmira, N. Y., assignor to James Manufacturing Company, Fort Atkinson, Wis., a corporation of Wisconsin

Application October 10, 1932, Serial No. 637,027

7 Claims. (Cl. 119—16)

My invention relates to an apparatus and process of preparing, storing and dispensing food to animals and of housing the animals in such a manner as to facilitate their feeding in connection therewith.

The primary object of my invention is to virtually eliminate fire hazards in structures of the described class and to make possible the complete protection of the feed and housed animals from fire.

It is the object of my invention to provide a process and apparatus for the practice of my process by which I am enabled to harvest without regard to weather conditions, moist or green hay, immediately store that hay and so store it and ventilate it that it will maintain its content as when green and will have the advantages of green feed; so that it will not be subject to fire due to spontaneous combustion, as I propose to remove all ignitible gases when and as they are generated, as well as to prevent the generation of any material amount of such gases; and to so store the hay that it will be removed after the lapse of a considerable period by degrees in such condition that it is the substantial equivalent of green feed, thereby enabling the feeding of green material, other than ensilage, during the winter period.

It is my particular object to provide a process and apparatus for the storing, in green or moist condition, or both, of hay, preferably in chopped form, and therefore capable of having a large amount introduced into a small space. When so stored it will be in such proportions that, while compressible, it would nevertheless be easily ventilated from top to bottom and from side to side and all combustible gases will be continuously removed as they may be generated.

It is my object to provide a combination of liquid bearing ensilage storage and relatively dry hay feed storage so as to permit of the ready removal of both types of feed, utilizing the ensilage storage as a part of the support for the hay storage, while at the same time maintaining an adequate ventilation of the storage.

In the actual practice of my invention suitable means may be provided for loading and unloading and for conveying the unloaded material from both ensilage and hay storage to points of feeding.

It is the object of my invention to centralize in a separate building separated by fireproof containers and passageways the storage of ensilage and hay, access to which may be had to remove such material in the proportions necessary to its feeding and no more, and to provide for such removal to the point of feeding where the animals are located through covered passageways so that it is not necessary to either expose the feed or the operators during inclement weather.

It is my object to provide separate systems of ventilation for the feed storage so segregated and for the animal houses to which batches of feed are intermittently conveyed and in which the feed is completely consumed so that no fire hazard from the storage of feed will be permitted in the animal buildings.

It is my object to provide a system of feed storage and animal housing ventilation; and a system of stalling and feeding animals, in combination with a system of supplying at stated intervals given quantities of green feed of diverse kinds.

It is a further object to provide an arrangement of interchangeable units capable of being manufactured in standard sections, capable of being assembled in diverse lengths into standard buildings and capable of assembly in a variety of combinations by putting together different units.

It is also my object to provide such a unitary construction for different sizes and types of such buildings that they may be adequately combined in varying combinations and are capable of indefinite extension in varying combinations, at the same time providing unobstructed ventilation and light for the interior of the buildings as well as easy egress and ingress of the animals housed therein and to provide ready accessibility to various parts of the buildings by attendant.

It is my object to provide a process and apparatus by which a number of extensible buildings, each consisting of a plurality of interchangeable sections, are provided, said buildings being used with hay storage containers, said containers and buildings being so connected in a system that there will be no fire hazard from the feed storage containers.

It is my object to provide a system of fireproof buildings and ventilated storage containers such that the diverse requirements of removing animal gases and heat from the buildings, and hazardous gases and heat from the storage containers may be taken care of without interference of the one with the other.

It is my object to provide fireproof buildings

capable of being manufactured in sections at a factory and assembled on the farm by simple assembly means.

It is a further object to provide a system of building a construction so that there may be interconnected fireproof circulatory buildings for stock feeding, milking, food conveying and food storage.

It is my object to provide a container, either with or without lightning rods, of such material as metal that is an excellent electrical conductor and which, owing to the large mass of metal, will carry electric discharge from storms without danger to the contents of the chamber; and to provide in conjunction therewith adequate ventilation to eliminate combustible and ignitible gases which may be generated in the mass, thereby eliminating not only the cause of fire but the means by which explosions and fires may be propagated.

A further important and specific purpose of the invention is to provide stables with means for storing dry fodder as well as silage in concentric storage chambers, the combined capacity of which will be adequate for all of said animals, the relative cross sectional areas of the concentric chambers being proportioned to the ration requirements of the animals, whereby the contents of the respective chambers may be kept at predetermined relative levels throughout the feeding period, and whereby dry material stored in the outer chamber may be utilized to thermally insulate and protect the moist contents of the inner chamber.

My object is to not only provide means for storing wholly or partially dried fodder in such a manner as to protect silage and other moisture containing food from frost but to provide for the association with stables of storage facilities for both hay and silage having such characteristics that conditions in either the stable or the storage structure will not affect conditions in the other structure, but in which transfers of feed from storage to stable may be facilitated to the maximum extent.

Other objects are to provide means whereby hay and other fodder having similar characteristics may be gathered from the field and stored with a sufficiently high moisture content to prevent leaf detachment, shattering, and other nutrient losses and reduce to a minimum the danger of deterioration in storage, the development of heat and gases such as emanate from ordinary hay mows and which tend to promote spontaneous ignition or explosion of gases and the growth of molds; to provide storage facilities which will permit of safe storage of hay and other fodder after a period of field drying of such short duration as to permit accurate forecasts of weather conditions between the time of cutting and storing; to virtually eliminate the danger to housed stock and to farm buildings from either wind or lightning, and reduce to a minimum the fire hazards resulting from the use of lanterns, lighted matches, and cigars, and from defective wiring in electrically lighted structures; and in general to provide a substantially fireproof animal housing and feeding structure having superior sanitation and improved lighting, ventilating and food handling facilities.

A further object is to provide means whereby such buildings may be constructed in accordance with a variety of designs from standardized factory made sections or members of convenient handling and shipping size which can be readily assembled by inexperienced persons at the place of installation in series of units capable of indefinite extension in accordance with the number of sections used, and in accordance with any one of various predetermined plans of arrangement in lineal form, quadrangular form, or other forms suited to a wide diversity of arrangement. Each animal housing unit is formed of factory made side wall sections of standardized dimensions and central or roof sections capable of lineal assembly in the desired number extending from side wall to a central ridge, whereby units of various widths may be constructed from sections identical with those employed for the construction of units of different widths, and whereby the length of any unit may be determined by the number of sets or groups of side wall and roof sections in longitudinal series.

A further object of my invention is to provide a housing and food storage structure of maximum capacity in proportion to roof area and wall area, and having minimum bracing and reinforcing requirements, whereby the cost of construction and the cost of heating may be reduced to a minimum.

In the drawings:

Figure 1 is an isometric view of an animal feeding and housing structure of a generally rectangular form;

Figure 2 is a horizontal section of a portion of the structure shown in Figure 1, drawn to a plane indicated by the line 2—2 of Fig. 1;

Figure 3 is a fragmentary view, in vertical section, drawn to line 3—3 of Figure 2;

Figure 4 is a fragmentary view, in vertical section, drawn to line 4—4 of Figure 2;

Figure 5 is an isometric view of a standardized arch section, a set of associated roof sections and a connecting post supported beam, said sections and the beam being slightly separated from a position of complete assembly and mutual support;

Figure 6 is a fragmentary isometric view, showing a fragment of one of the arch sections as it appears when attached to a foundation wall, and a detached fragment of an associated arch section;

Figures 7 and 8 are sectional views drawn respectively on lines 7—7 and 8—8 of Figure 1;

Figures 9, 10 and 11 illustrate various possible groupings of units similar to the units disclosed in Figure 1 and constructed from standardized sections of the same character;

Figure 12 is a fragmentary vertical sectional view drawn generally to line 12—12 of Figure 2 and showing fragments of the fodder storage chamber and associated stable and connected corridor;

Fig. 13 shows an enlarged view of a portion of the structure shown in Fig. 12;

Figure 14 is a plan view of the fodder storage chamber showing portions in horizontal section, drawn generally to line 14—14 of Figure 12;

Figure 15 is a sectional view of a base portion of the fodder storage chamber, drawn to the line 15—15 on Fig. 14;

Figure 16 is an isometric view on an enlarged scale showing portions of three interlocked outer wall sections of the fodder storage chamber in assembled relation to an associated lining wall support and spacing member, and also showing a fragment of the lining sections to which the

illustrated spacing member is directly connected;

Figures 17 and 18 are fragments showing modified forms of the foraminous ventilating passage walls in elevation;

Figure 19 is an enlarged view of a portion of the structure shown in Fig. 21;

Figure 20 is a section on the line 20—20 of Figure 12 looking in the direction of the arrows;

Figure 21 is a section on the line 21—21 of Figure 12 looking in the direction of the arrows;

Figure 22 is a section on the line 22—22 of Figure 9, the details of the feed receptacle A being omitted;

Figure 23 is a section on the line 23—23 of Figure 10, the details of the feed receptacle A being omitted;

Figure 24 is a section on the line 24—24 of Figure 11, the details of the feed receptacle A being omitted.

Like parts are identified by the same reference characters throughout the several views.

Buildings

The improved building structure shown in Figure 1 comprises a series of units, including one or more stable units, a milking room and pen unit, one or more fodder storage units, and corridor units for connecting the other units, said units being formed at a factory in standardized sections adapted for assembly in accordance with a variety of plans for arrangement of the units, either in a generally rectangular grouping of the units as shown in Figure 1 or in a lineal grouping, either with or without lateral extensions, as indicated generally in Figures 9, 10 and 11. All of the units in any group will preferably have a common foundation.

In Figure 1 I have illustrated two storage units A associated with two stable units B to which the units A are connected by corridors C. The stable units B are cross connected at the ends nearest the storage units by a pen unit D, and their other ends are cross connected by a milk house E and corridors F.

The various units are standardized in such a manner that the factory made sections may each include inner and outer walls and an intermediate layer of material adapted for thermal insulation, each section being capable of transportation and assembly at the place of installation, either in the form illustrated in Figure 1 or any one of the forms illustrated in Figure 9, Figure 10, Figure 11. Various other assemblies may be made as desired by the purchaser, and as hereinafter explained, the sections are adapted for the construction of units of any desired width or length.

Animal housing units

The structure of the animal housing units, the connecting corridors and the sections of which they are composed, will now be described in detail, after which the storage units, their component sections, and their relation to the animal housing units will be described.

The walls of the stable units will preferably have the general contour disclosed in prior United States Letters Patent No. 1,745,588, dated February 4, 1930, and granted to James Manufacturing Company, assignee of the invention herein claimed, except that for the purpose of housing live stock, the arched portion of the structure will preferably be supported by vertical walls 20 (Figures 2, 3 and 6) such as concrete walls which extend upwardly from the floor level 21 to a sufficient distance to provide the desired head room. The arrangement of the stalls is not material to the present invention, and the stall frames, mangers, etc., may be assumed to be of any ordinary construction. In Figure 2 I have illustrated a central passageway 22 flanked by rows of stalls 23 and marginal passageways 25 with interposed gutters 26 in accordance with ordinary practice in stables having two rows of stalls and a central feed passage. In the construction shown in Figure 2 this feed passage is aligned with a corridor C through which food for the animals may be conveyed from the associated storage chamber A, thus making it possible to employ ordinary carriers in so conveying the food supplies to the animals. End chambers 27 may be provided for the respective stables, and these chambers may be used for the storage of grain, meal, or other food supplies incapable of maintaining combustion unless such combustion is otherwise supported. In Figure 11 a stable with a double row of stalls is illustrated.

The side and roof portions of the stable units and all other units having similar exterior contours may be formed of upwardly and inwardly arched sections, the lower margins of which rest upon the foundation and the upper margins of which connect with tangentially extending roof sections and a ridge section which connects the roof sections at the respective sides of the ridge (Figures 4 and 5). The arched side sections may each be formed with outer walls 28 and inner walls 29, each preferably metallic and connected by arched frame members 30 preferably of the channel bar type. At their lower ends these frame members are secured to anchor bolts in the foundation 20 by angle clips 31, the horizontal portions engaging the anchor bolts 32 and the vertical portions being welded, riveted, or bolted to the central web of the channel bar 30 at one side, whereas the opposing channel bar of the adjacent section will preferably be provided with a notch 33 (Figure 6) in which the vertical flange of the angle clip is adapted to be received. The space between the inner and outer walls is filled with an incombustible heat insulating material 34 preferably composed of spongoid gypsum, or porous slag-like material capable of being at least partially self-supporting and containing a multitude of air pockets, whereby maximum heat insulation may be obtained with minimum addition to the weight of the section.

The upper ends of these arched sections at the respective sides of the unit may be provided with an end piece 35 which is adapted to be received between the upper and lower flanges of an I-beam 36 supported by posts 37. The upper surface of this beam is in substantial registry with or slightly inset from the upper end of the outer wall 28 of the arched section, whereby the outer wall of the next section may lap over the beam and the upper end of the wall 28. Connecting flanges 38 at the upper ends of the arched sections may be bolted to the central web of the I-beam.

At its opposite side the I-beam receives the end margin of a horizontally extending ceiling section which will now be described.

The ceiling sections may be composed of channel bar end pieces 40 connected by upper and lower metallic walls 28a and 29a respectively, and provided with non-heat conducting filling 34a. These channel bars are similar to the side

bars 30 and adapted to be bolted together as indicated at Figure 7, whereupon they may be connected with each other by metal battening strips 41—42, bolted or riveted to flanges of the channel bars. Similar battening strips are employed to connect the laterally adjacent arch sections. The outer battening strip 42, when exposed to the weather is preferably of a generally channel-shaped form adapted to receive a suitable packing 43 of bituminous material having a high melting point, adapted to provide an air-tight connecting point for the sections. The side of ceiling sections not formed by channel bars 40 are adapted to rest on the outwardly extending flanges of T-shaped frame members 30a with the lower surface 29a of ceiling section flush with the lower face of the flanges of frame members 30a.

Roof sections extend tangentially from the upper ends of the arched sections. These roof sections may comprise rafters 45 and a sheet metal roof covering 46. The lower ends of the rafters are supported by the I-beams 36.

The number of sections employed for each transversely extending set composing the roof and the ceiling will depend upon the width of the unit. Frame pieces 30a and 45 will preferably be one piece and of respective lengths for each variable width. Suitable braces 51 are employed to support the ceiling sections from the roof section. Braces 52 serve the additional purpose of securing the roof members 45 together at the ridge 50 by extending over and fastening to ends of members from both sides.

The outer covering of each roof section may be lapped over the upper margin of the outer covering of the next section below it, including the arched section, as shingles or metal roofing are lapped in an ordinary manner. Similarly, the outer covering of any arch section in registry with one of the corridor units or with a pen unit may be lapped over the outer covering of the corridor or pen unit, as indicated at 54 in Figure 3, this lapping of the outer covering of one arch unit upon another one at right angles thereto being extended downwardly along each side, as indicated by the dotted line in said Figure 3.

The corridor units may be wholly formed of side arch sections and ridge sections, since these sections will furnish corridors of sufficient width. The width of the corridor units may be varied however, from that described in the preceding sentence by varying the number of roof sections employed to connect each side arch section with the ridge section, the number of ceiling sections being varied accordingly.

The ends of units D and F of Figure 1 are made to join the curved side walls of units B (see Figure 1), the details of which are shown in Figure 3. The end walls of units B have vertical sections such as is shown at the ends of B and E (Figure 1). Where a corridor unit is so connected the associated arch section of the unit to which it is attached will be cut away, as indicated in Figure 3, to form a doorway or opening 54' between the supporting channel bar arches, but if doors are desired, partitions 55 will be erected (preferably in the corridor) these partitions being provided with framed doorways and doors 56. Where vertical end walls are used, doorways and doors of ordinary type may be provided, as indicated at 57 in Figure 1.

It will be noted that special corridor and pen unit sections 58 and 59, respectively, are provided to connect the corridors and pens with arched walls of other units.

The buildings E shown in Figures 2 and 22 are adapted for use by cows with calves, the partitions 6, 7, and the others shown allow for the housing of both cows and calves.

Milk room

To promote sanitation, and also to enable the necessary equipment employed in milking to be kept outside of the stables, I preferably provide a milk room unit E (Figure 2), the outer walls of which may be composed of the standardized sections above described. As shown in Figure 1, this milking room E is connected with the two stable units B and B' by corridors F. Each of these corridors has a longitudinal partition 60 (Figure 2), and at the ends which connect with the milking room, gates 61 and 62 are hinged in pairs to the end post of the partition, and so arranged with reference to milking room partition members as to control the movements of the animals to and from the room and alternately from the respective stables.

Use of such a room in the combination herein claimed enables me to remove milking operations and the milking equipment from the stables to a room that is wholly free from even the daily food supplies or any combustible material whatever, whereby electric lighting and operating equipment may be freely used with no danger that even the daily rations of the animals may become ignited by short circuits, or friction of mechanically moving parts.

The buildings D shown in Figures 23 and 24, illustrate enlarged stalls which may be used as pens for bulls or calves.

Feed storage

Fires in animal shelters usually originate from ignition of combustible fodder, such as hay, straw, and other dried vegetables. Ignition of such materials may occur spontaneously inasmuch as such materials necessarily contain considerable moisture when stored, and large masses thereof will almost invariably become heated nearly to the ignition point while curing in the mow. Also, such material is very readily ignited by lightning or by a spark from an apparently extinguished match or from a lighted cigar. It has been heretofore assumed that a very large animal loss of such farm buildings through fire is unavoidable, and this loss has become so frequent and heavy that fire insurance companies dislike to accept such risks.

The fire hazards have not heretofore been successfully eliminated by storing hay in stacks or in separate buildings for the reason that such stacks or separate buildings are necessarily located in such proximity to the stables as to not only allow fire to be communicated to combustible stable structures or animal housings, but the ordinary hay stack or hay barn burns with such rapidity and develops such intense heat as to injure or destroy animals in nearby housings, even though the housings are constructed of fire proof materials.

But I have discovered that it is possible to combine under one roof a silo structure and a hay or dry fodder storage chamber which encircles the silo, and by making this silo and the encircling chamber columnar in form, and preferably cylindrical, it is possible to provide storage for hay or other dry fodder in sufficient quantities to satisfy the requirements for all the

animals in an associated stable at less expense and with less wall and roof areas than is required for ordinary barns having basement stables and superposed hay mows. By forming the walls of the silo and the encircling storage chamber of metal or other fireproof material such structures may be located in close proximity to a stable which is also formed of fireproof material without danger of injury to the animals if the dry fodder should become ignited, since the latter will burn from the top downwardly, and initially the fire will be in the form of a torch at the top of the columnar structure, after which accumulations of ash will smother the fire sufficiently to prevent excessive heating of the adjacent stable or stables.

In its preferred form my storage unit comprises an annular hay storage chamber 70 (Figures 12 and 14) which encircles a silo 71 having a wall 72 which may be formed of any suitable non-combustible material, but preferably the walls of both chambers are formed in sections as hereinafter described. The silo has a vertical chute 73 along one side, this chute being located within the annular chamber 70 and provided with removable wall sections 74 affording access from the silo chute at different levels. Similar removable wall sections 75 permit access from the hay storage chamber to the chute 73, and at one side of the chute there are rungs 76 which serve as a ladder.

The bottom of this chute (Figure 14) connects with a passage 77 leading outwardly across the storage chamber 70 and communicating with one of the corridors C leading to an associated stable.

Ventilation of the hay

The silo wall 72 is encircled by a foraminous wall 78 which is spaced from the silo wall to form an annular vertically extending ventilating passage 79 on the outer side of the wall 72. The outer wall 80 of the hay storage chamber 70 may be formed of metal, tile, or other incombustible material and it will ordinarily be made circular in form in correspondence with the preferred cylindrical form of the silo wall 72. Spaced inwardly from this outer wall 80 there is another foraminous cylindrical wall 81 which provides an annular ventilating passage 82 for the outer side of the column of hay stored in the chamber 70.

By providing a ventilation space on both the outside, the inside and the top of the hay mass; and by providing the distance between such ventilation spaces no greater than that which will permit the free circulation of gases throughout the hay mass and their evacuation, I am enabled to continuously remove the gases and control the temperature in the hay mass. This action is improved by the use of chopped hay because I then deal with a product of uniform size and substantially uniform density when stored.

By employing a feed cutter for cutting hay and other dry fodder into short lengths it can be delivered into the annular chamber by the same means employed for delivery of silage into the silo, and I have discovered that for a stable housing fifty cattle and having an associated silo fourteen feet in diameter and a height sufficient to furnish silage to such cattle during an ordinary winter season in quantities to satisfy modern dairy requirements, an annular storage chamber for dry fodder may be so formed about the silo as to reduce the expense of storing hay to a minimum, and that such a concentric chamber will require a radius of only about five to five and one half feet between its inner and outer foraminous walls to provide storage for a complete supply of dry fodder to the animals for a period equal in duration to that during which they can be supplied with silage from the silo. The proportionate width of the annular storage chamber for the dry fodder may, of course, be varied to some extent in accordance with calculated requirements for properly proportioning the ration of dry fodder to silage, but the proportions above given are based upon standard rationing practice.

Ensilage freezing prevented

It thus becomes possible to utilize the dry cut fodder to protect the silage from freezing, the height of the dry fodder column maintaining the same proportionate level with reference to the silage throughout the feeding period.

It will be observed that the silo chamber 71 extends below the level of the chamber 70. Assuming that the capacities of the two chambers are proportioned in accordance with feeding requirements as to any given cross sectional portion, it will be obvious that the contents of the silo chamber may be kept continuously below the level of the contents in the storage chamber 70. Therefore, the hay will more effectively protect the silage from freezing.

My invention comprehends a construction of an animal structure embodying means for storing combustible foods without danger to the animals contained therein, and without danger of a destruction of the entire building if such combustible material should become ignited. I am the first to devise means for utilizing dry combustible material to protect silage from destruction by either fire or frost.

Protection from lightning

In my improved structure the outer metallic walls spaced from the hay storage chamber by annular ventilated passages form an excellent electrical conductor which, owing to the large cross section of metal, will carry almost any electrical discharge from storm clouds without danger to the contents of the chamber even though no lightning rods may be provided.

By the use of metal containers for the hay I am enabled to provide an excellent conductor for electricity, the mass of the metal being sufficient for that purpose. In conjunction with this metallic container I employ the ventilation system on both sides and the top of the hay mass so as to carry away any gases which might be ignited by static electricity.

By the provision of metal containers I also provide greatly increased heat radiating surfaces which serve to convey the heat away from the hay as generated in it, which heat is further dissipated by the air flow over the metal containers.

I, therefore, have the cooperative relationship between the metal, the dissipation of heat and the ventilation of the hay in accomplishing the object of preserving the hay against fire and explosion.

Continuous ventilation

I have also discovered that owing to the relatively small radial dimensions of the dry fodder or hay storage chamber, heating of the fodder during the curing period may be reduced sufficiently to eliminate the danger of spontaneous combustion and of the development of mold, by allowing the vapors and any generated heat units to be promptly carried away through the annular ventilating passages 79 and 82. Air, vapor, or other gases are required to travel a horizontal distance of only about two and one half feet from the center of the mass in order to reach either the inner or the outer ventilating passage. It will be understood that the dimensions indicated here are purely by way of illustration. The exact proportions depend upon the type of material being stored, the amount being stored and the general conditions of moisture and the like under which it is desired to store it. The principle to be followed is to never have the hay mass of greater size and thickness than can be conveniently, continuously and thoroughly ventilated throughout the entire mass so that there can be no rise in temperature to a dangerous point or an accumulation of combustible gases which may become ignited by electricity or otherwise.

While the silo wall and the outer wall of the fodder storing unit may be formed of any fireproof material, I prefer to form these walls of sheet metal and to construct them from factory made sections of standardized dimensions which can be readily assembled at the place of installation. Each section is arcuately curved in correspondence with the predetermined curvature of the wall in which the section is to be assembled, and each section is otherwise of a generally rectangular form. For example, the outer wall sections have a central web 80a flanked on three of its margins with a horizontal flange 80b and vertical flanges 80c, the terms "horizontal" and "vertical" having reference to the position of these flanges when assembled with other sections to form said wall. Along the remaining side of the web 80a there is a reversely folded flange composed of members 80d and 80e which are substantially parallel with each other with sufficient space between them to receive the flange 80b of an adjacent section, as best indicated in Figure 16.

The foraminous walls 78 and 81 are provided with webs 81a, 81x and 81y and may be similarly flanged, and these walls may be supported from the silo wall 72 and the outer wall 80 of the unit by spacing plates 96 which are bolted, riveted, or welded to certain of the horizontally extending flanges 80d of the outer wall or corresponding flanges of the silo wall and the similar flanges such as 81d of their associated foraminous walls, as also indicated in Figure 16. The sections in each annular series will have their respective flanges 80c and 81c butted and secured together by a channel-shaped bar 90 which is adapted to bind the flanges of adjacent sections together and to be secured thereto by bolts or equivalent fastening means or by spot welding, if desired.

The respective sections will be preferably so assembled that their flanges will extend into the respective ventilating passageways 79 and 82, whereby the outer surface of the exterior wall and the inner surface of the silo wall may be kept comparatively smooth.

A conical roof having metal rafters 100 and a sheet metal covering 101, formed in radially extending tapering sections, may be employed to cover both the silo and the dry fodder storage chamber 70. The sections which compose the roof covering will preferably have side margins provided with V-shaped rib flanges adapted to be lapped over or within the corresponding V-shaped flanges of the other sections in each annual series, whereas each of the upper sections is lapped over the upper margin of the sections in the next lower series as in ordinary roofing.

The rafters 100 may be connected with the upper margin of the top sections of the outer wall by flanged coupling members 105 (Figure 19) and L-shaped brackets 106, the vertically extending members of which may be bolted directly to the rafter in each case and the horizontal members may be connected by bolts 107 or equivalent means to the horizontal flanges of the coupling members 105 and the associated flanges of the top wall sections. Each rafter may comprise a single beam of any suitable cross section, it being immaterial to the invention herein claimed whether angle iron beams, or beams of any other cross section are employed. Their upper ends are supported in the channel formed at the lower margin of the cylindrical cupola wall 111. The flange 110 is conically inclined downwardly and outwardly, and the base ring 109 has a parallel flange 112 between which and the flange 110 the upper end of the rafter is received.

The cupola may be an ordinary ventilating cupola except that it is provided with an axially disposed vertically extending filling chute section 115, the lower end of which is connected with extension members 116, 117, 118, which extend downwardly and outwardly substantially parallel to the roof. An elbowed outlet member 119 may be connected to the lower end of the section 118, or to either of the other two sections 116 or 117. Therefore, the three sections may be employed to deliver material into the outer portion of the chamber 70, whereas the two sections 116 and 117 may be employed without the section 118 when the material is to be delivered into said chamber adjacent the silo wall.

The vertical section 115 is provided with a sleeve 124 which supports a spur gear wheel 125 which may be driven from a motor 126 by means of a pinion 127 secured to the motor shaft. The motor is employed to rotate the section 115 to carry the outlet member 119 in a circular path, whereby silage may be distributed annularly in the silo or cut hay similarly distributed in the annular chamber 70. The upper end of the section 115 has swivelled joint connection at 128 with a tube 129 which extends to the feed cutter or an associated blower for filling the storage chambers.

The foraminous walls 78 and 81 will preferably have the webs of their sections formed of sheet metal which is slitted at intervals, and the material between adjacent slits pressed into the form of a projecting louver 130 (Figures 16 and 17). These louvers may be separated by obliquely extending unslitted bands 131, as shown in Figure 16. If desired, however, parallel louvers 132 may be formed between vertically extending bands 133, as shown in Figure 17. But any other form of foraminous wall may be substituted, since these walls may, if desired, be composed of woven wire as indicated at 134 in Figure 18. The foraminous wall structure shown in Figures 16 and 17 are preferred for the reason that the unslitted bands 131 or 133 reinforce the structure.

The woven wire sections may be provided with angle iron frames which will afford adequate

strength, but these walls offer a greater obstruction to the passage of air and also allow small particles to pass from the chamber 70 into the ventilating passages, thereby necessitating a more frequent cleaning out of such passages.

To facilitate cleaning the ventilating passages of dust, fragments of leaves, and stems which may enter these passages from the hay storage chamber 70 I provide radially extending clean-out passages 135 in or underneath the floor of the storage chamber 70 and leading outwardly from the annular ventilating passage 79 to the exterior whereby suitable hooded coverings 136 will preferably be employed to protect the outlet of each clean-out passage 135. The lower sections of the outer wall of the chamber 70 will preferably be provided at intervals with clean-out openings protected by similar hoods 137. The outlet end of the passage 135 and the clean-out openings in the lower portion of the ventilating passage 82 will preferably be provided with suitable gratings 139.

Filling the food containers

When the chute is being employed for filling the silo both sections 117 and 118 may be removed and the outer member 119 coupled directly to the section 116. These sections are supported from an annular track 120 by means of a trolley 121 and hanger 122. The track is supported from the rafters by hangers 123.

To facilitate observation and manual manipulation of the rotatable end portions of the filling spout I provide a swinging platform 140 which has a sleeve 141 at one corner through which a post 142 extends. This post projects upwardly above the level of the platform and forms part of a trussed guarding frame in association with other vertical corner posts 144 and 145, top rails 146 and 147, and stay rods 148. The inner end of this platform may be swung upon the supporting post 142 to various positions over the silo, or even over the hay storage space if desired, whereby a person standing on the platform can reach the swinging filling chute or ascend to the cupola upon rungs 149 which connect the posts 145.

It will be observed that when the mass of chopped hay is blown through the pipe 129 thence downwardly through the pipe sections 116, 117 and 118 and out the spout 119, these sections act like a nozzle and, under the influence of the force of the hay being blown, the entire pipe will rotate about its support in the ventilator 111 with no other power to impart to it a rotary movement than that supplied by the blower supplying the chopped hay. This blower is not illustrated as it may be of any conventional character customarily used in connection with such mechanism on farms.

Process

One of the serious losses in the operation of a farm is the loss of hay which is spoiled by the weather. Such spoilage either results from being unable to cut the hay when it should be cut, because it is wet and cannot be cured when wet as heretofore known in the art, or because of the wetting of the hay after it has been cut while it is still in the field being cured. This is particularly true of some types of hay, such as alfalfa, which has to be cured with great care. While it is highly desirable to feed hay that is preserved in green or semi-green condition, this has heretofore been impossible during the winter months because the hay has to be cured and dried prior to storage. The advantages of green hay feed are similar to the advantages of feeding green corn in the form of ensilage.

According to my process, I cut the hay, even though it may have a moisture content due to inclement weather conditions, which would otherwise make the cutting or storing of it undesirable. This hay is chopped in an ordinary cutter and delivered in chopped condition into a tall, relatively narrow column, the sides of which are supported by any type of member permitting the free circulation of air to the center of the column and out through the column of hay.

The thickness of the column is never greater than that which would permit of this free circulation of air throughout the walls of the column and the body of the hay out of the top of the column. By making the column of annular cross section, it is possible to ventilate the inside and outside walls surrounding the hay column, and it is possible also to make the column of such thickness to permit continuous circulation of air through the hay mass.

Such circulation maintains the hay free from mould or spoilage; and permits of the rapid evacuation of combustible gases which might be fired by either static electricity or from the electrical system of the plant. Either natural ventilation thus achieved may be employed or supplemented by mechanical ventilation. This results in the chopped hay being maintained in a fresh, semi-green condition with all the value of green feed, of particular advantage to all stock in winter.

The hay is maintained in fresh condition due to the continued circulation of air, which is supplemented by the natural moisture content of the air present in the air particularly during winter time.

By the utilization of metal as the supporting walls for the hay container, I provide a satisfactory conductor of electricity to convey away any static electricity due to storms and the like to prevent the accumulation of any residue combustible gases, if any should happen to exist. I do not exclude the use of wood or of ceramic materials but when metal is used, I find that it has this additional advantage.

The next coordinate step in my process is the placing of a water-tight, preferably of sectional metal, ensilage tank or container on the inside of the hay containing cylinder which acts as a support for the inner wall of the hay containing cylinder and forms with that wall an impervious spaced wall through which air will be caused to circulate as described.

In the same manner an outside impervious wall is placed around in spaced relationship to the outside foraminous wall of the hay containing cylinder. This ensures the circulation of the air. Vent openings at the bottom of the outside wall and inside wall may be provided as indicated in Figure 15 to keep the entire circulatory system for the evacuation of gases from the hay.

Returning to the silo, I so proportion the size of the silo and the hay chamber that the hay chamber acts as an insulation for the ensilage, as these proportions ensure the reduction of hay and ensilage in about the same amount throughout the consuming season.

As the ensilage contains chopped green corn which has a certain amount of liquid in it, the wall of the ensilage chamber is liquid proof.

A common entrance passageway is provided from the feeding stables through these storage chambers, portions of the walls of the storage chamber forming portions of the walls of the entrance passageway. Such portions of the walls are removable to facilitate the removal of the hay and ensilage throughout the season. It will be noted that the walls of this entrance passageway are fireproof, being composed of metal and fireproof insulation so that in case of any fire, there could be no transmission of the fire from the storage chamber to the feeding stables.

This passageway extends as a tunnel through a portion of the hay cylinder up to the side wall of the ensilage chamber with a vertically disposed tunnel passageway leading upwardly to the hay and ensilage chambers.

As a part of the practice of this process, the green feed is removed from this passageway only in such amounts as may be necessary for the consumption of the animals at any one feeding to prevent the accumulation of any feed, so as to eliminate the fire hazard. The animals are fed according to my circulatory system in the feeding stables, to which feed is circulated to them from the storage chambers. The animals then circulate directly or through communicating passageways of fireproof character to a milking station E in progressive lots.

A common milking station may be the center through circulatory passageways F for the ingress and egress of batches of animals from the feeding shelters B, each of which feeding shelters is supplied from its own remotely connected storage chamber unit A connected to the feeding chamber by the fireproof passageway C. In this manner the several functions of the several buildings, according to my system of feeding are segregated.

They are independently lighted by natural light and ventilated. Their ventilation systems are entirely separate from those of the feed storage chambers. There are no storage chambers in any part of the animal feeding and milking chambers. Separate means of ingress and egress are provided from each unit.

The units themselves are so combined that they may form protecting exercising yards in inclement weather.

By making the buildings of pre-fabricated, sectional material, they are capable of being extended to varying lengths and in varied widths due to the number of group sections interposed between the side walls thereof.

It will be understood that I desire to comprehend within my invention such modifications as may be clearly embraced within the scope of my claims and invention.

It will be also understood that claims to the specific features of the animal buildings, together with adequate description and drawings are more fully set forth in my copending applications filed May 8, 1933; Serial No. 669,896; filed May 8, 1933, Serial No. 669,897; filed May 8, 1933, Serial No. 669,898 and it will be understood that the failure to so claim them in this application is not a dedication or abandonment of the novel subject matter thereof.

I hereby make a cross-reference to my copending application, Ser. No. 639,490, filed Oct. 24, 1932, for Improvements in buildings for animals and a system of handling and feeding animals. While some of the figures of the drawings in that application and some of the figures in the drawings in this present application Ser. No. 637,027 are the same, other figures in the drawings of each of these two applications do show constructions not illustrated in the other; and nothing claimed in this application Ser. 637,027 is claimed in said co-pending application Ser. 639,490.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. An animal housing and feeding structure comprising a stable composed of fire proof non-heat conducting walls in combination with an offset annular columnar storage chamber for dry fodder of greater height than the stable and having means for withdrawal of heat and moisture from the fodder at substantially all levels along both the inner and outer sides of the column, and means including a fire-proof corridor extending from said stable through part of said heat withdrawal means of said storage chamber to connect said stable with the interior of said storage chamber, whereby the said stable and chamber constitute separate structures but are connected to each other by a separate connecting corridor whereby any fire hazard in the storage chamber would be ineffective to injure the stable or its contents.

2. An animal feeding and housing structure comprising the combination of a columnar annular storage chamber for dry fodder provided with ventilating means along its inner and outer walls extending upwardly from the bottom portion and provided with top outlets, a stable extending laterally from the storage chamber, and a corridor connection extending into the lower portion of the storage chamber and laterally to connect the storage chamber with the stable, said storage chamber having a chute adapted to permit progressive feeding of material into the corridor connection from the top of the column of material in the storage chamber, said feeding and housing structure being made of fire-proof construction whereby any fire hazard in the storage chamber will be ineffective to injure the stable or its contents.

3. In a farm structure including a barn for domestic animals, a communicating connection to the barn whereby feed may be transferred to the barn, and a feed storage container connected to the communicating connection, said feed container consisting of an outer chamber, an inner chamber and ventilating means in one of said chambers, said chambers constituting receptacles for hay and ensilage, and having annular side walls.

4. In a farm structure including a barn for domestic animals, a corridor connected to the barn whereby feed may be transferred to the barn, and a feed storage container connected to the corridor, said feed container consisting of an inner chamber and an outer chamber, said chambers constituting receptacles for hay and ensilage, said hay receptacle having ventilating means adapted to admit air to substantially all portions thereof, and said corridor directly connecting said feed container and barn.

5. In a farm structure including a barn for domestic animals, a substantially closed corridor connected to the barn whereby feed is transferred to the barn, and a feed storage container

consisting of an inner chamber and an outer chamber, said chambers being coaxial and constituting receptacles for hay and ensilage, and one of said chambers having ventilating means adapted to admit air to substantially all portions thereof, said corridor directly connecting said feed container and barn.

6. In a farm structure including a barn, a corridor connected to the barn whereby feed is transferred to the barn, and a feed storage container connected to the corridor, said feed container consisting of an inner chamber and an outer chamber, one of said chambers constituting a receptacle for hay and the other for ensilage, said hay receptacle having ventilating apertures for admitting air to substantially all parts of the hay contained therein, said corridor connecting said barn and feed chamber.

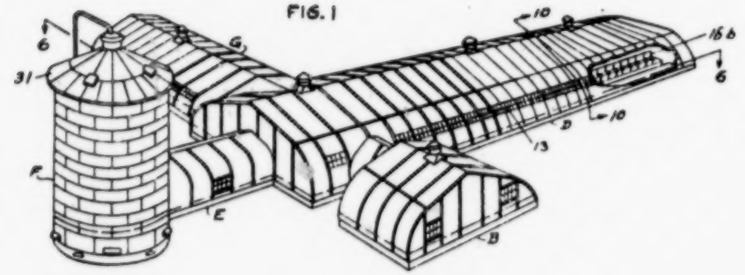
7. In a farm structure including a barn, a corridor connected to the barn whereby feed is transferred to the barn, and a feed storage container connected to the corridor, said feed container consisting of an inner chamber and an outer chamber, said chambers constituting receptacles respectively for ensilage and hay, said hay receptacle having ventilating means for admitting air to substantially all parts of the hay contained therein, said ventilating means constituting slotted walls, said corridor directly connecting said barn and feed chamber.

FREDERIC J. KREUTZER.

BUILDING

Filed Oct. 25, 1932 6 Sheets-Sheet 1

FIG. 1



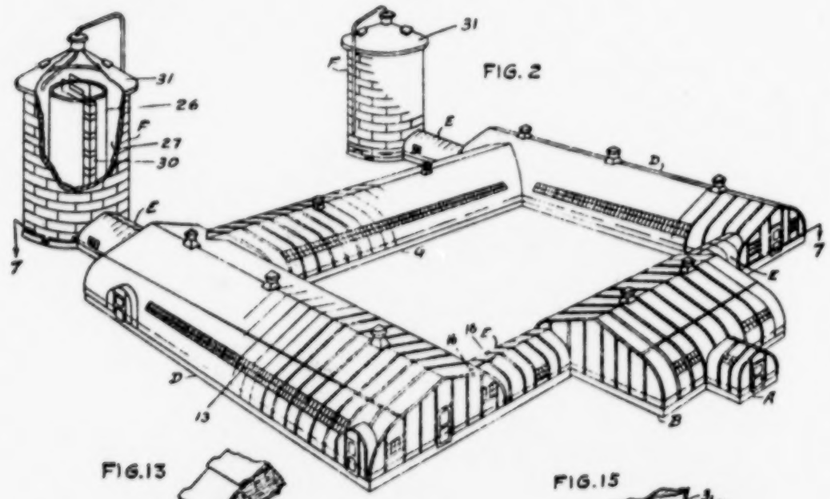


FIG. 2

FIG. 13

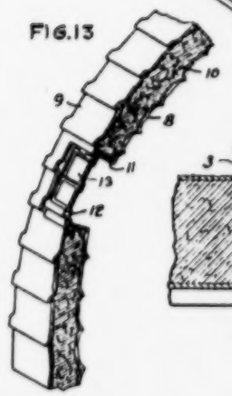


FIG. 14

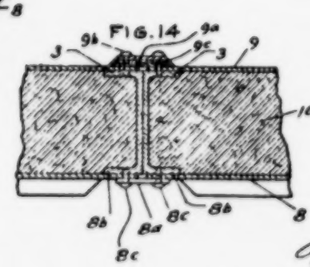
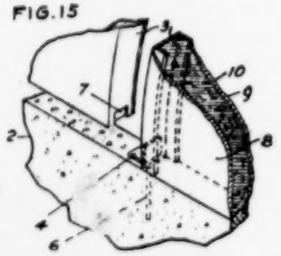


FIG. 15



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Nov. 20, 1934. F. J. KREUTZER 1,981,418

BUILDING

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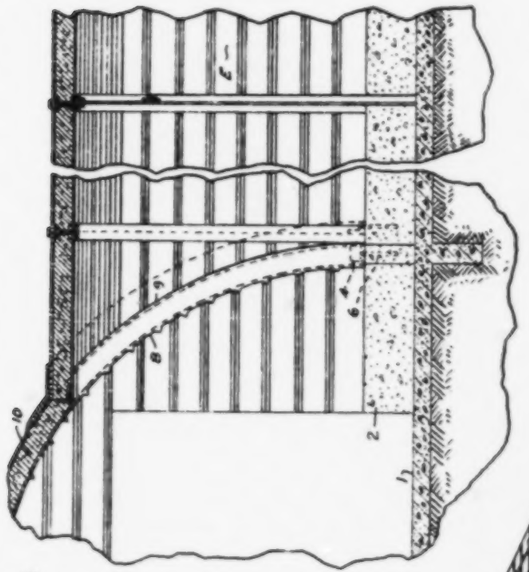

FIG. 16

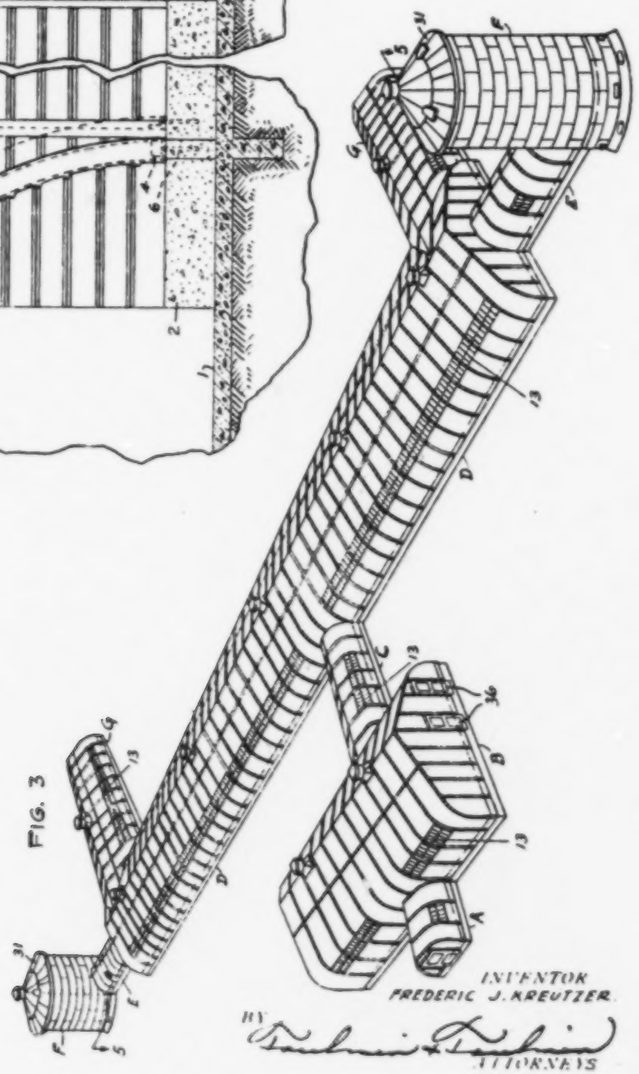

FIG. 3

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FIG. 4

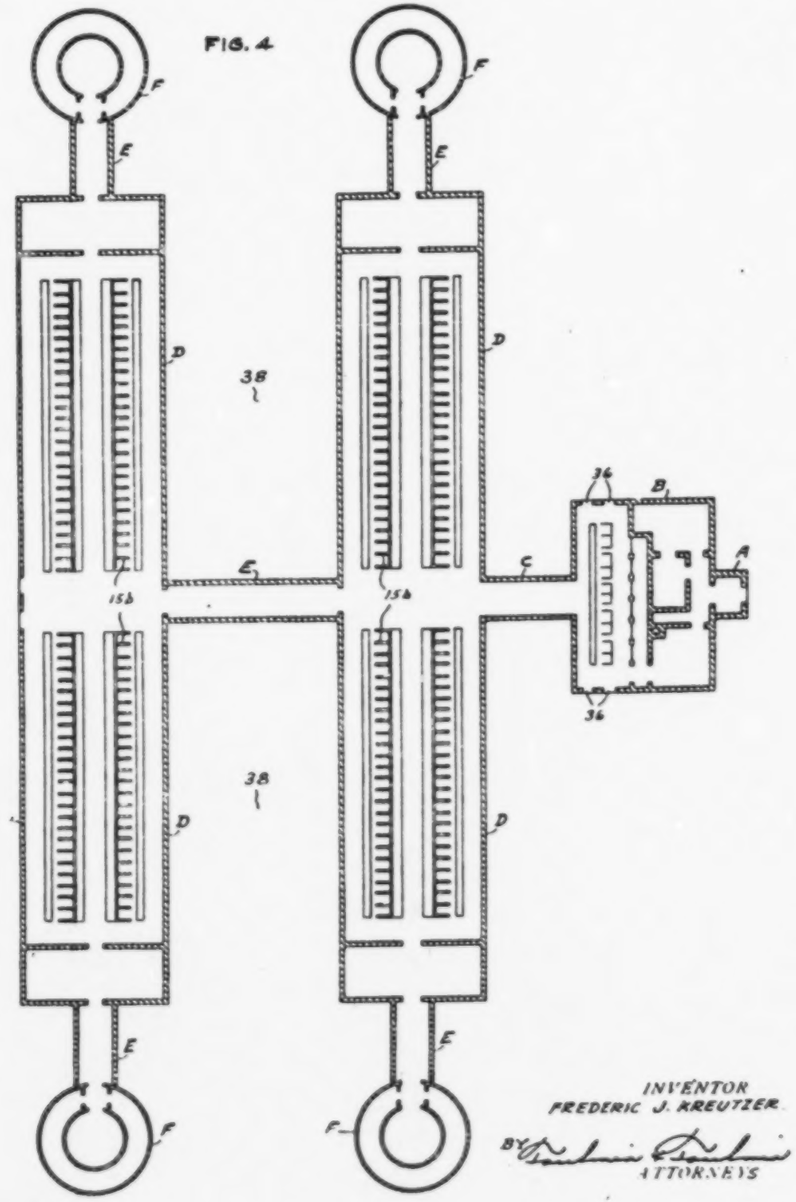

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FIG. 5

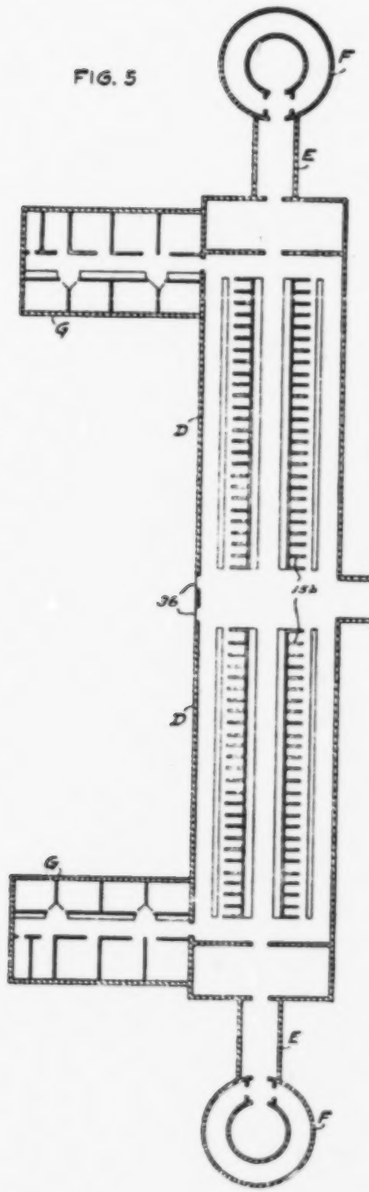

FIG. 6

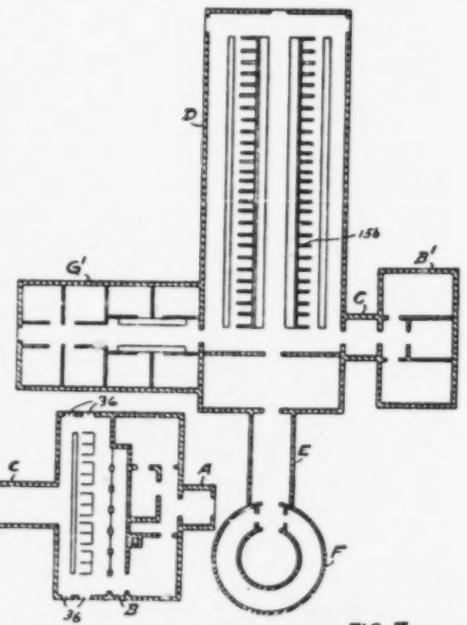

FIG. 7

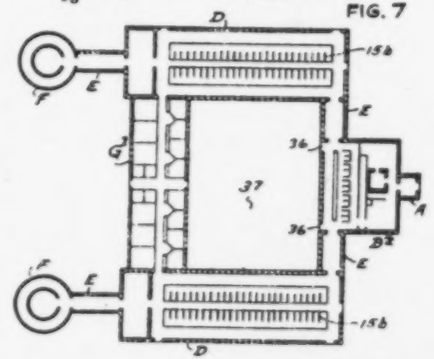

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FIG. 8

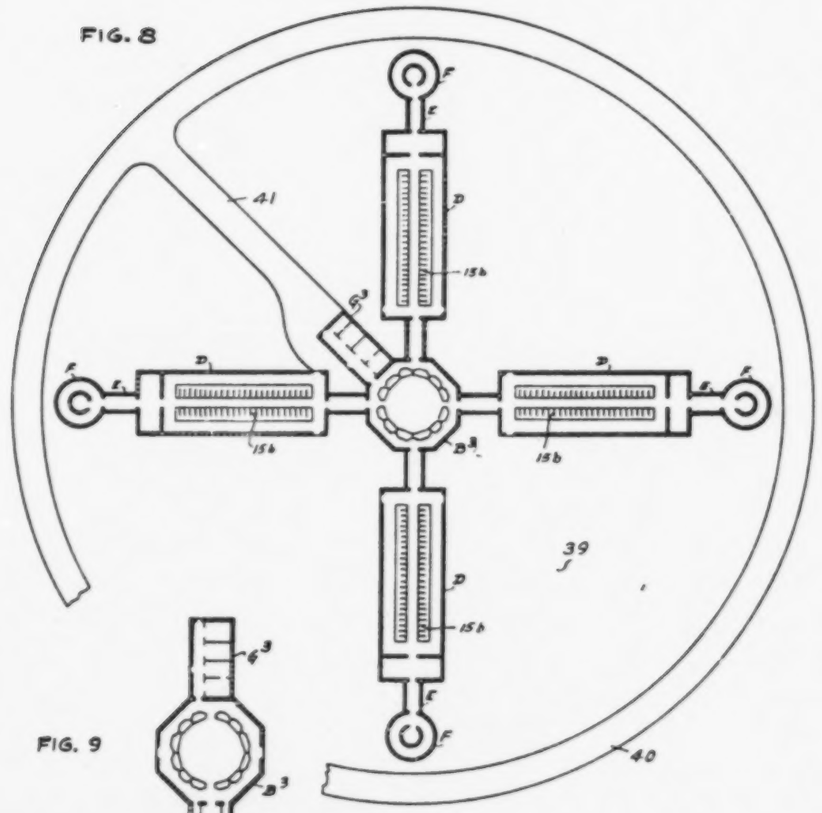
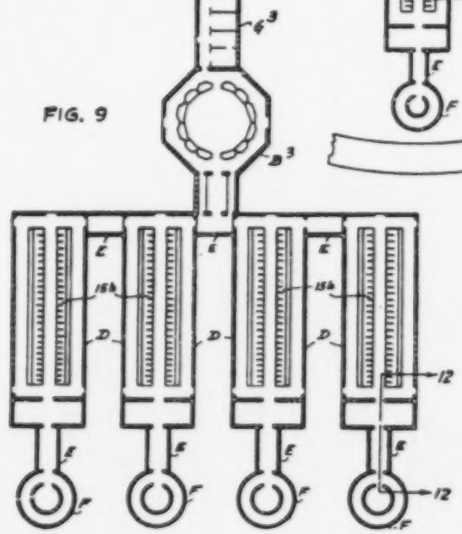


FIG. 9



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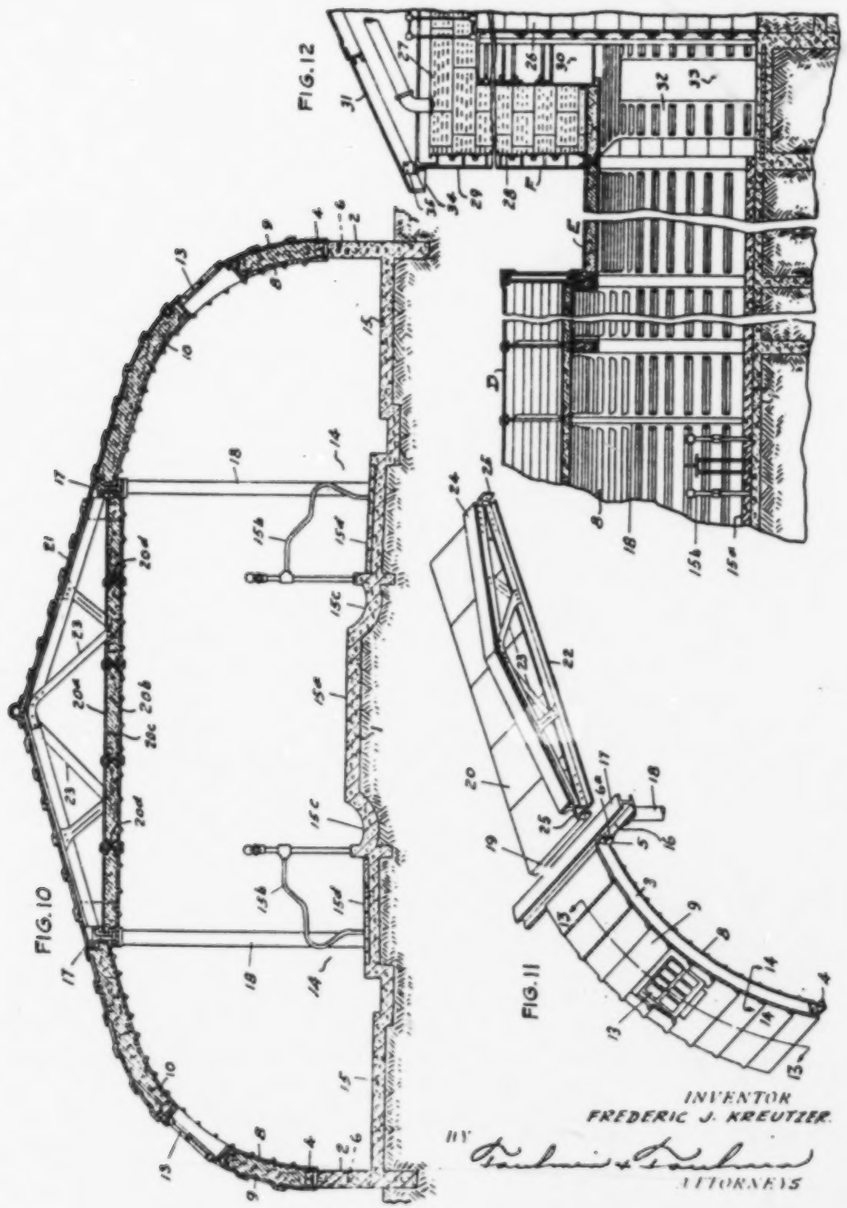

FIG. 12

FIG. 10

FIG. 11

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UNITED STATES PATENT OFFICE

1,981,418

BUILDING

Frederic J. Kreutzer, Elmira, N. Y., assignor to James Manufacturing Company, Fort Atkinson, Wis., a corporation of Wisconsin

Application October 25, 1932, Serial No. 639,490

2 Claims. (Cl. 119—16)

My invention relates to buildings and, in particular, to sectional, standardized, expansible buildings adapted to be erected in units to form enclosures of fireproof character for stock, and enclosures or protecting barriers for stock when exercising or feeding in the open.

It is a further object of my invention to provide a structure comprised of several unitary elements which, by multiplication of such standard unitary elements, can make buildings of different widths, heights and lengths and different combinations of buildings, all in connection with fireproof feed storage chambers.

It is a further object of my invention to provide a system of feeding from remotely located fireproof storage feed chambers enough feed which can be consumed by the stock in the buildings of this invention so that there will be no storage of feed and, therefore, no fire hazard in the buildings in which the animals themselves are located.

In particular, it is an object of my invention to provide the combination of a metal or other fireproof storage chamber for hay and, if desired, for ensilage, and to provide a common communicative passageway between said storage chambers and the stables comprising the buildings of my invention.

It is an object of my invention to provide adequate air circulation throughout the buildings and these storage chambers for the proper ventilation of the hay and of the buildings.

It is my object to provide a building having a fireproof foundation, such as concrete, accurate side walls having ventilation and light windows, and intermediate roof construction comprising a roof plate and a sloping roof, such roof section being supported upon spaced columns which also support the inside ends of the arcuate side walls.

It is an object to provide a dead air space filled with insulation in the side walls and a dead air space in the roof section to thereby insulate against the heat and cold on the outside of the building so they will not affect the interior of the building.

It is an object to provide the side walls of sectional metal so that the individual side wall unit comprises an arcuate strip having exterior independent overlapping metallic strips and an interior metal skin supported and spaced by arcuate metal ribs.

Referring to the drawings:

Figure 1 is an isometric perspective of a T-shaped barn and feed storage chamber combination partially broken away to show the arrangement of the interior of one of the barns;

Figure 2 is a square combination of buildings;

Figure 3 is a U-shaped combination of buildings with a remotely connected lactary or milking station;

Figure 4 is a plan view in section showing the arrangement of the units in parallel with feeding areas in between, with a remotely located milking station;

Figure 5 is a section on the line 5—5 of Figure 3;

Figure 6 is a section on the line 6—6 of Figure 1;

Figure 7 is a section on the line 7—7 of Figure 2;

Figure 8 is a plan view in section of the radial type of building arrangement with a central milking station and remotely located feed chambers with feeding pastures or exercise lots between the buildings;

Figure 9 is a horizontal sectional view of a common milking station and a plurality of longitudinally disposed parallel feeding barns and feed storage chambers; the details of the feed receptacle F being omitted;

Figure 10 is a section on the line 10—10 of Figure 1 showing the construction of the building;

Figure 11 is a perspective of one section of the building showing it in the process of assembly;

Figure 12 is a section on the line 12—12 of Figure 9;

Figure 13 is a section on the line 13—13 of Figure 11;

Figure 14 is a section on the line 14—14 of Figure 11;

Figure 15 is a perspective, partially in section, of two of the side wall sections about to be joined and permanently mounted on the foundation wall at their abutting bottom and side edges;

Figure 16 is an enlarged section through one of the side walls of the buildings and the communicating passageway buildings on the line 16—16 of Figure 2.

It will be understood that this building organization is comprised of certain fundamental essential elements which I have found necessary for the practice of housing and feeding stock, particularly dairy stock, although, of course, the principles apply to other types of animals.

These elements are: a remotely located venti-

lated chamber for the storage of feed, such as chopped hay, which may be continuously ventilated for the removal of gases to control the temperature to prevent spontaneous combustion. Such a chamber is preferably made of metal so as to be proof against lightning. It is also preferably made of segmental sheets of metal in order to facilitate its manufacture at the factory and subsequent erection by bolting or welding on a farm. Associated with this feed container may be a silo of any desired material and both of these containers are arranged to discharge into a common communication passageway or building to the unitary stable which is of sufficient size to accommodate stock that will be fed from these feed containers.

It is the principle of my system of feeding to never store any feed in the stable where it may become ignited either by spontaneous combustion, by a lantern, a carelessly thrown match, and the like.

The third element is the provision of a stock building having no loft for hay storage, which thereby eliminates all danger of fire and confines the building to the one purpose of housing the stock in the best possible manner. Such a building is comprised of unitary sections which can be fabricated at a factory and assembled on the farm with ordinary labor. It is fireproof, being made preferably of metal, with a concrete or similar type floor, has no partitions and can be cross ventilated as well as longitudinally ventilated in order to insure proper ventilation to the stock and adequate cleanliness.

It is so arranged that the windows can direct sunlight on to the stock. It is insulated against heat and cold.

The fourth element which may be employed is a separate building of this character arranged for milking and connected by one of the communication units. In large installations I prefer to have each building for the housing of the stock arranged to accommodate approximately fifty cows but this is a matter of choice. By having a milking station of very much less capacity the stock can be moved from the feeding position to the milking station and back again without interfering with the rest of the stock.

The milk can then be conveyed away from the milking station into adjacent rooms without the possibility of contamination by conducting the milking operation and the treatment of milk in communication with or in the presence of the stock that are awaiting milking or are being fed, and this provides for a marked sanitary advance in the art of milking.

It is a further object of the invention to provide buildings that are low in height and, therefore, form adequate enclosures for exercise lots or feeding pastures between the buildings where the stock are protected from the wind and snow and, at the same time, can secure adequate exercise, and on pleasant days, ample sunlight, so that the stock in cold weather will not have to stand in the shadow of the buildings. Heretofore, in winter time, the southern exposures being limited in number, it has been necessary to have the stock for a portion or a large part of the day stand in the shadow of the barns in the feed lots and exercise lots.

Referring to the drawings in detail, A designates an entrance building which is preferably composed of the arcuate side wall sections hereinafter described. Such a building of the A type is used for communication purposes. B, B^1, B^2 and B^3 indicates a building used as a milking station, C a communication building, D feeding stables, E communication passageways to the feed storage chambers F.

Referring particularly to the detail construction of the buildings, as shown in Figures 10, 11, 12, 13, 14, 15 and 16, 1 designates the foundation which has side walls 2 on which are mounted the arcuate side wall sections shown in Figure 11. These side wall sections comprise a pair of arcuate rib plates 3 having bottom end flanges 4 and top end flanges 5. These rib plates 3 are preferably U-shaped in section as shown in Figure 15. The lower attaching plates 4 may be bolted by bolts 6 embedded in the side walls 2. The adjacent side wall sections may be recessed at 7 for the reception of the bottom plate 4.

These side plates 3 support interiorly a corrugated metal sheet 8 and overlapping exterior transversely disposed metal sheets 9. Between these sheets is placed any insulation material designated 10 to insulate from the heat and cold. The joint between adjacent sections is covered by an exterior strip 9a bolted by bolts 9b to the flanges of the U-shaped members 3. Beneath this strip 9a is a waterproof composition 9c. On the interior of this joint is a plate 8a overlapping the sheets 8 and connecting them to the flanges 8b of the U-shaped members 3 by bolts 8c. When desired, a window frame 11 may be placed in the side wall to carry a sash 12 having glass 13.

It will be noted that this window being arranged at an angle to a vertical plane is so disposed as to direct the sunlight on to the animals standing in the general area designated 14. It also provides light for adequate cleaning of the foundation 1 as at 15.

The upper ends of these arcuate side wall sections are attached by the plates 5 to bolts 6a into the recesses 16 of the longitudinally disposed I-beam girders 17 which are supported on spaced vertical posts 18 carried on the foundation 1. The upper ends of the side wall sections, therefore, are nested in the U-shaped recesses 16.

The other of these U-shaped recesses formed by the I-beam 17 receives the abutting end 19 of the ceiling plates 20 which are carried between the truss members which support the ceiling plates 20 and the roof members 21. These truss members are comprised of a horizontally disposed angle iron or I-beam 22 having diagonally disposed truss members 23 interconnecting and supporting I-beam roof members 24. Mounted on these truss members are angular end plates 25 for attachment of this roof unit to the girders 17. The ceiling plates 20 are comprised of sheets 20a and 20b which are spaced to form an air space 20c in which insulation material may be placed. They are connected together by either I-beams or abutting U-shaped members 20d which extend longitudinally of the building between the trusses. The whole combination of the upper and lower plates, the insulation and these beam members 20d combine to form what is known as the ceiling plate.

It will be noted that this central roof section comprising the truss, the roof and the ceiling plates is omitted in the case of buildings, such as A, C and E.

Feed chambers

The feed storage chamber is so arranged that the silo 26 and the ventilated hay storage chamber 27 formed by the foraminous false walls 28 within the exterior wall 29 discharge through a common chute 30. They are housed by a common roof 31. This chute communicates with a horizontally disposed communication passageway 32 leading into one of the communication buildings E.

This passageway 32 also has side doors 33 for entering the hay chamber 27. Thus, the adjacent barn D may be ventilated by the passage of air through the communicating building E, passageway 32, chute 30, out through the passageway 27 to the space beneath the roof 31 which is provided with a suitable ventilator or the air may pass out beneath the eaves 34 as the roof 31 is suspended above the wall 29 by the bracket plates 35, if so desired. The numeral 36 in Figs. 3, 4, and 5 designates doors.

In Figures 2 and 12 may be found a platform diagrammatically illustrated with railings extending above part 26.

It will be seen that, by the use of such buildings, it is possible to vary the width and the height of the buildings, as well as the length.

The height of the building is determined by the height of the foundation side walls 2 and the posts 18. The building may have one or more roof sections, or none at all.

It will be further observed that the load on the roof section is taken on the posts 18 but any lateral thrust is also transmitted through the side wall sections and thence to the foundation walls 2. Any load on the side wall sections is taken on the foundation side walls 2 and against the girders 17 and the intervening roof section. Thus, a very light, strong and insulated building is provided of indefinite extension but which can be manufactured from a few standard parts that can be easily erected by ordinary labor on the farm. When so erected, the building is not only fireproof but is lightning proof due to the mass of metal. There is no possibility of spontaneous combustion in the buildings devoted to the housing of the stock because there is no combustible material stored therein and the disastrous hazard of fire which destroys breeding stock that has taken years to develop is eliminated.

It will be understood that such stock is the product of many years of breeding and no money payment by way of insurance can replace the destruction of such animals. Therefore, it becomes a matter of vital importance to eliminate any chance of destruction by fire or lightning of animals that are irreplaceable. It is also necessary to have adequate sunlight and ventilation. It is likewise essential to remove the milking operation from any possible contamination and to provide buildings that will permit of the ready movement and circulation of the stock into and out of the buildings and to and from the milking station.

It will be observed that the stock can pass along the floor at 15 for this purpose, the feed can be delivered to the stock along the floor at 15a so as not to impede the movement of the stock. Adequate stalls or stanchions are connected at 15b and the feeding trough at 15c. The animal can stand upon the wooden or other floor 15d. The columns 18 can be located between the cows so as not to interfere with other standing room. Consequently, the space within this building is substantially without any obstruction. All the animals can be observed from any point in the building. The carrying of feed along the passageway 15a may be readily effected by hand, by carts, vehicles on rails or by overhead carriers suspended from the trusses. The load of such carriers is taken on the columns 18 without imposing that load upon the side walls.

It is further observed that each one of these sections can be made of such size and weight as to be easily handled in erection. Furthermore, the building is one that can be completely salvaged in the event of it being torn down. Furthermore, it is capable of expansion so that as the herd grows, it is possible for the owner to continue to attach additional standard sections to take care of his needs as they develop. The foundation may be extended or restricted to suit the superstructure. The present invention relates to the superstructure and not to the foundation, which may be varied in extent to correspond to the superstructure.

Building arrangement

One of the primary purposes of this invention is to provide such a standard system that various forms of unitary buildings may be employed.

For instance, Figures 1 and 6, which represent a typical arrangement of a fifty-cow barn, show an entrance building or milking station, as desired, a building for box stalls as at G or G', a stable as at D, a feed storage chamber F and communication buildings E, all of metal and of similar interchangeable sections. The building G is adapted for the use of cows with calves, and the like.

In Figures 2 and 7, the stables D are arranged in spaced parallel relation with intercommunicating buildings E connecting into a milking building B^2. The rear ends of these stables are interconnected by a box stall stable G^2 while the ends of the buildings D are provided with communication buildings E connected to the feed storage chambers F which contain sufficient hay and ensilage for supplying the cows in each of the buildings D, to which they are connected.

In Figures 1, 2 and 12, there are disclosed pipes which are adapted to convey chopped hay under pressure to the interior of the hay containers.

It will be noted that the cows in one stable can reach the milking station building without going through the other stable D.

By this arrangement the cows can be led through the doors 36 into the exercise lot 37 where they may have the sunlight and the air and be protected from the winds. The buildings form the enclosure, and, therefore, no fences are necessary.

In the forms shown in Figures 3 and 5 it is possible to feed from either of the feed storage chambers F to both stables D but still possible to move the cows to and from the milking station B without going through the other stable and disturbing the feeding or the handling of the cows in that stable. By projecting the unitary buildings G to form a U-shaped enclosure with the stables D a partially protected enclosure for the stock when exercising is provided.

In the form shown in Figure 4, more complete enclosures are provided by arranging another unit of feed chambers and stables connected by

a communication building E in parallel to form exercise lots therebetween as at 38.

In Figure 8 there is provided an arrangement by which the buildings are radially disposed in units connected into a central milking station B³. Between these radially disposed buildings are feed lots or exercising pastures 39 while around the entire series of buildings is an annular roadway 40 which joins a roadway 41.

Figure 9 shows a similar milking station with a plurality of stables D arranged in parallelism with their associated supply stations for feed in the chambers F.

It will be understood that I desire to comprehend within my invention such modifications as may be necessary to adapt it to varying conditions and uses.

I hereby make a cross reference to my co-pending application Ser. 637,027, filed Oct. 10, 1932, for improvements in Apparatus for storing and dispensing feed. While some of the figures of the drawings in that application and some of the figures of the drawings in this present application Ser. 639,490, are the same, other figures in the drawings of each of these two applications do show constructions not illustrated in the other; and nothing claimed in this application Ser. No. 639,490 is claimed in said co-pending application Ser. 637,027.

I make further cross reference to my co-pending application Ser. 669,898, filed May 8, 1933, which application is a divisional application of co-pending application Serial No. 637,027, above referred to. Application Serial No. 669,898 describes and claims a food container such as is illustrated in Figure 4 and others of the drawings of this application.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In combination in a building system, a plurality of stock housing barns arranged in spaced relationship, a milking building arranged therebetween with interconnecting communicating buildings, and remotely located feed storage chambers connected to the barns, each of said barns having its own feed storage chamber thus remotely connected whereby the stock in each barn can be fed from each feed storage chamber and moved to and from the milking building without disturbing the stock in the other barn, said milking building comprising an octagonal building having annularly disposed milking stanchions arranged therein.

2. In a system of buildings, a plurality of metal buildings including at least one barn, certain of said buildings being formed of similar interchangeable metallic sections, and having foundations, and a metallic food containing building composed of sections dissimilar to the sections composing the other buildings, said barn being composed of metallic side wall and roof sections, and a metallic milking building, said metallic food containing building having a spaced foraminous interior false wall for ventilating the contents thereof, and metallic sectional buildings composed only of said side wall sections and forming a communicating means between two or more of said sectional buildings.

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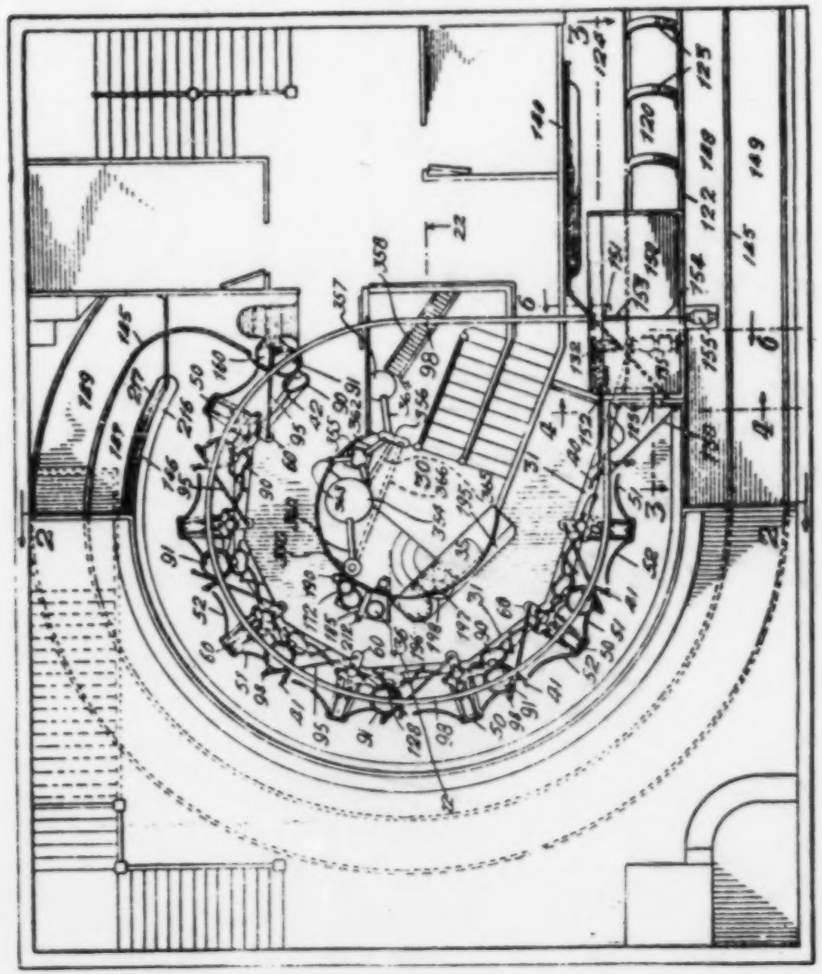

Fig. 1.

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DAIRY PLANT

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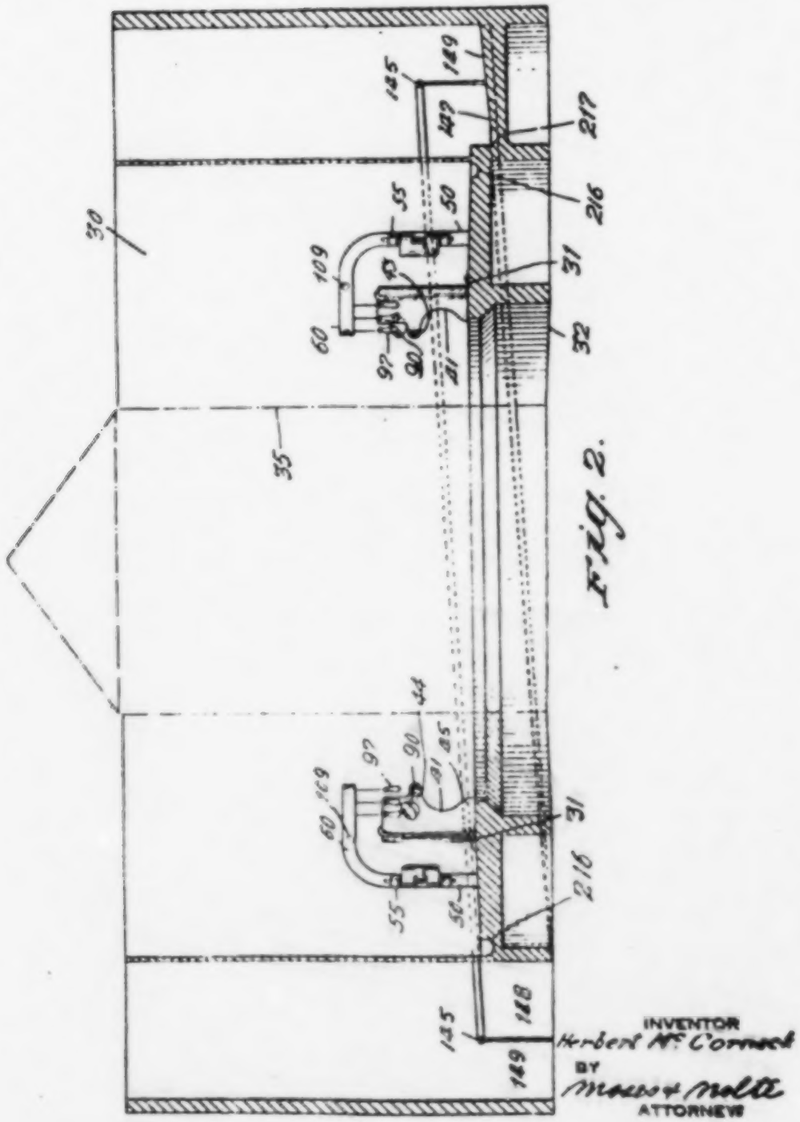

Fig. 2.

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DAIRY PLANT

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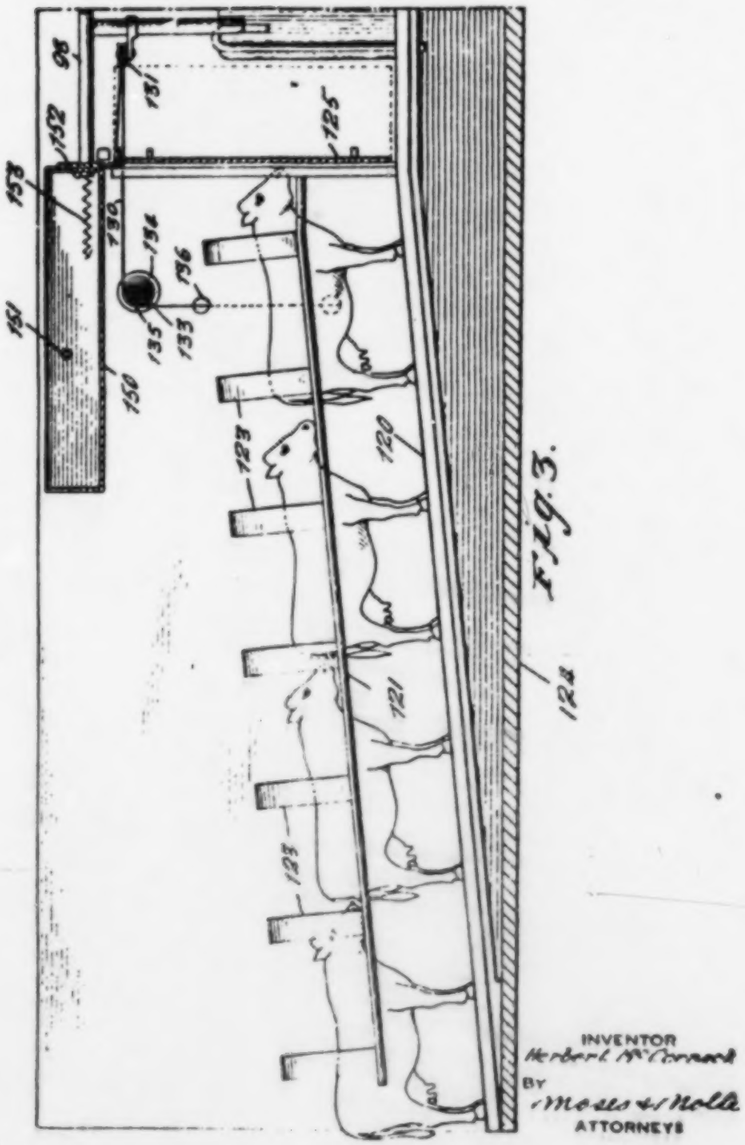

Fig. 3.

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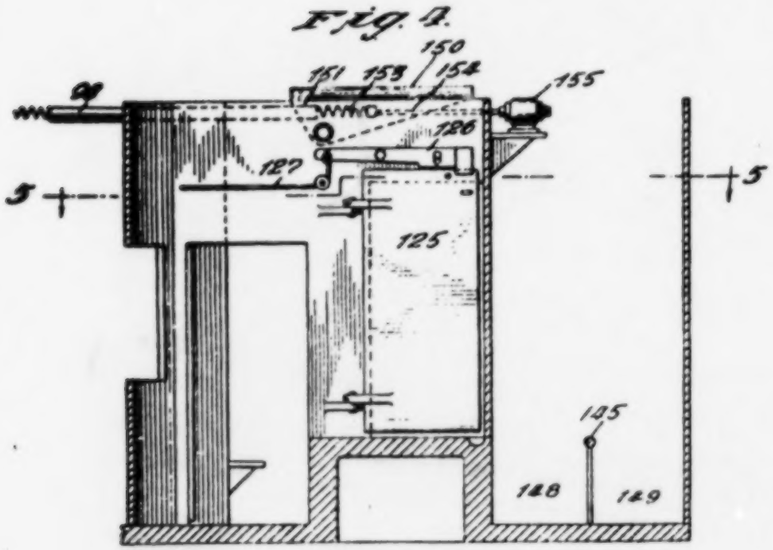
Fig. 4.



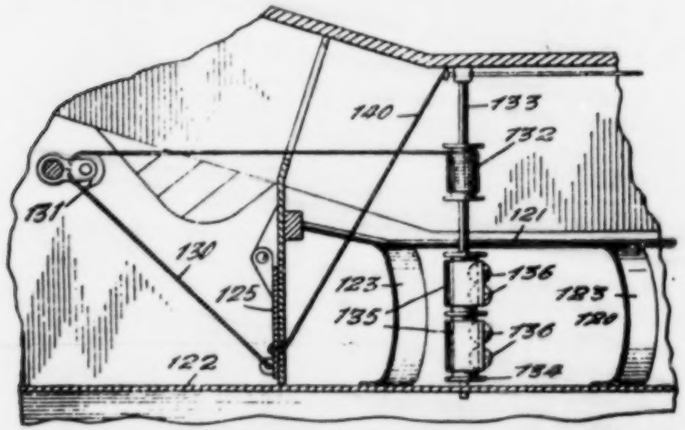


Fig. 5.

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DAIRY PLANT

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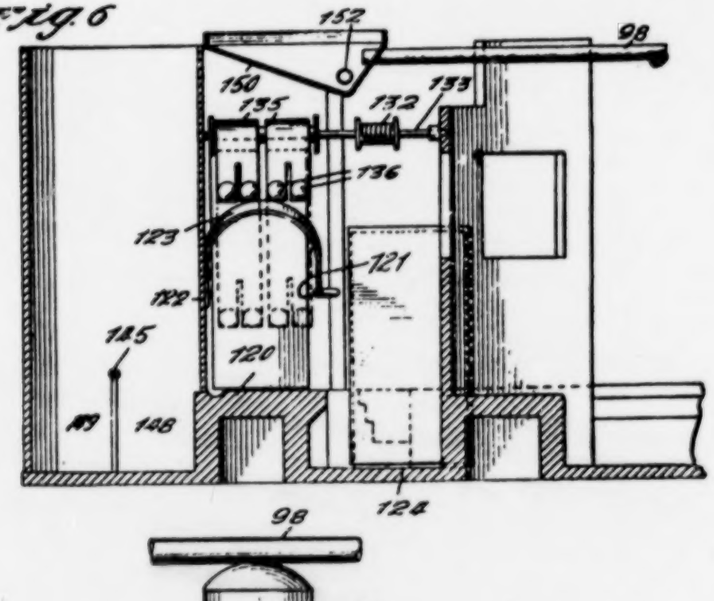
Fig. 6



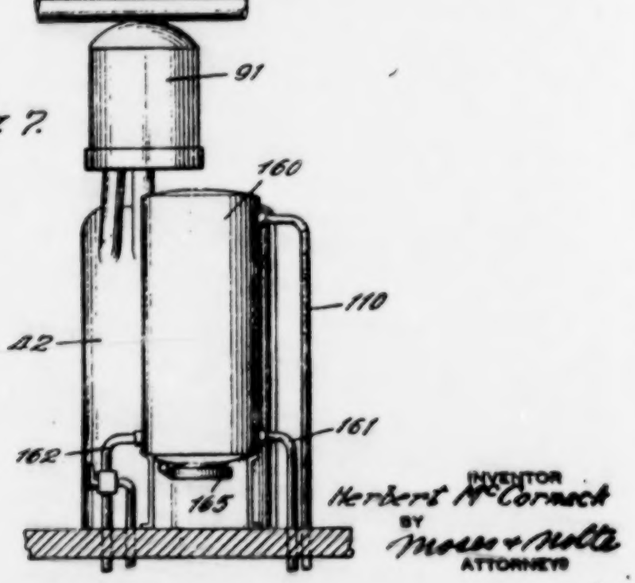


Fig. 7.

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DAIRY PLANT

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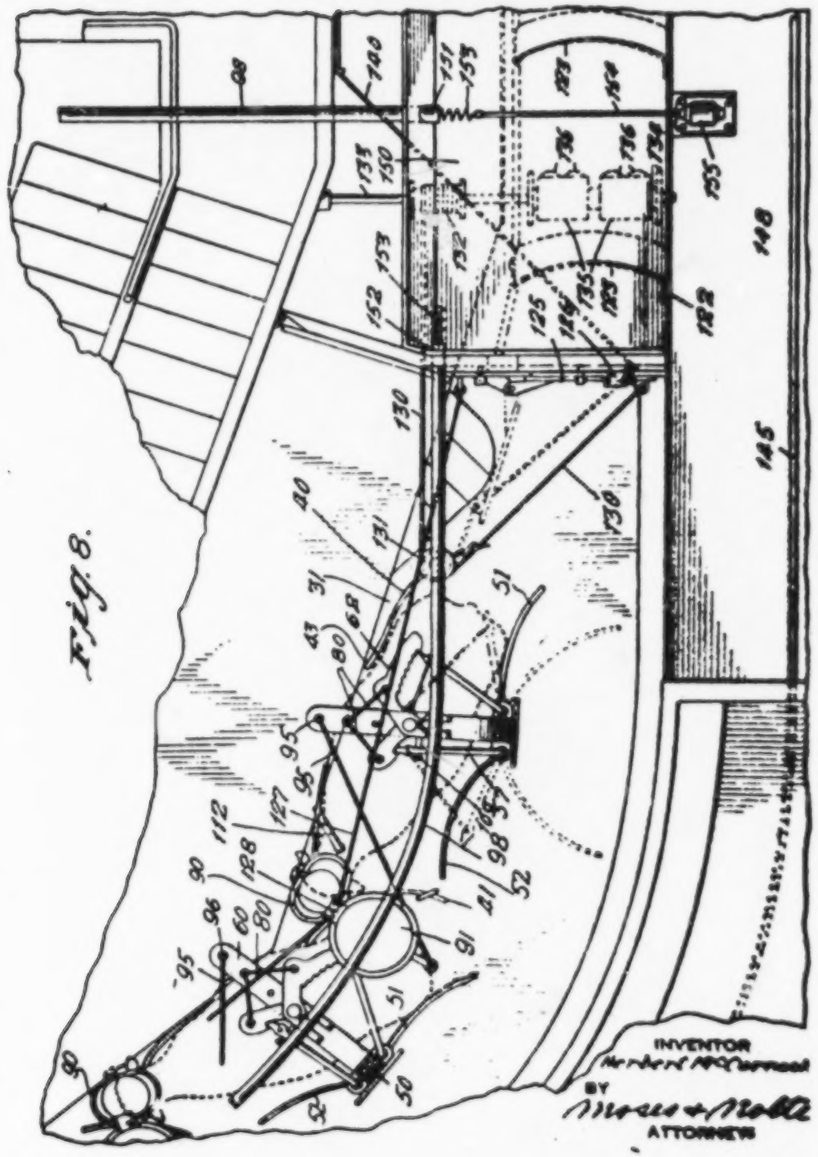

Fig. 8.

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DAIRY PLANT

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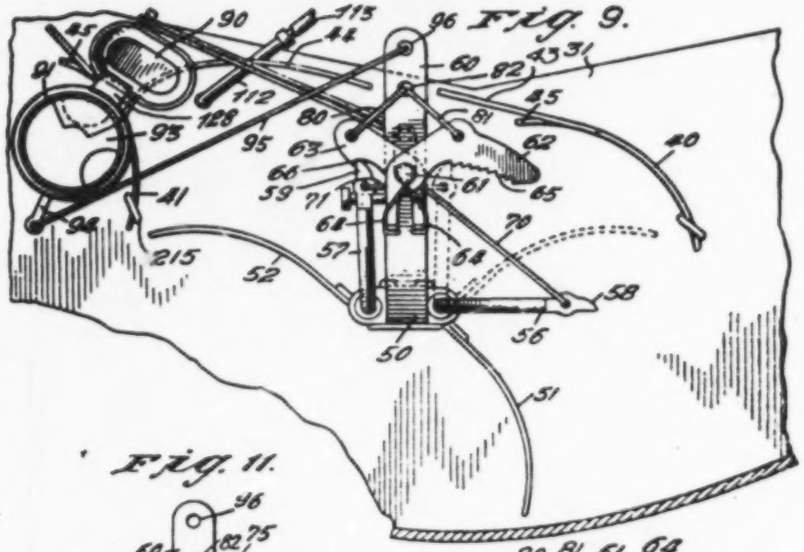

Fig. 9.

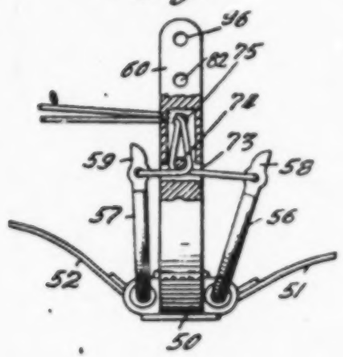

Fig. 11.

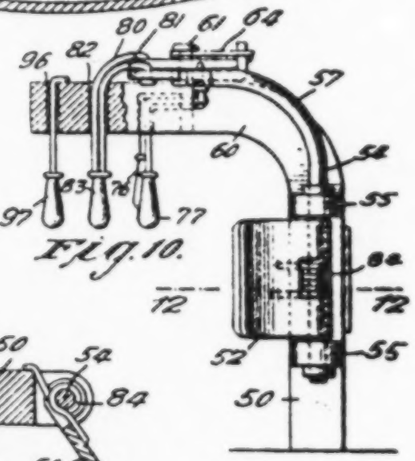

Fig. 10.

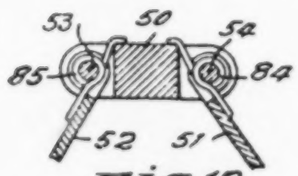

Fig. 12.

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June 1, 1937 H. McCORNACK 2,081,947

DAIRY PLANT

Filed March 1, 1933 12 Sheets-Sheet 8

Fig. 13.

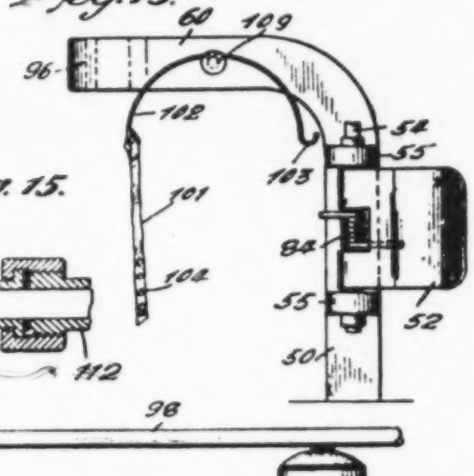

Fig. 15.

Fig. 14.

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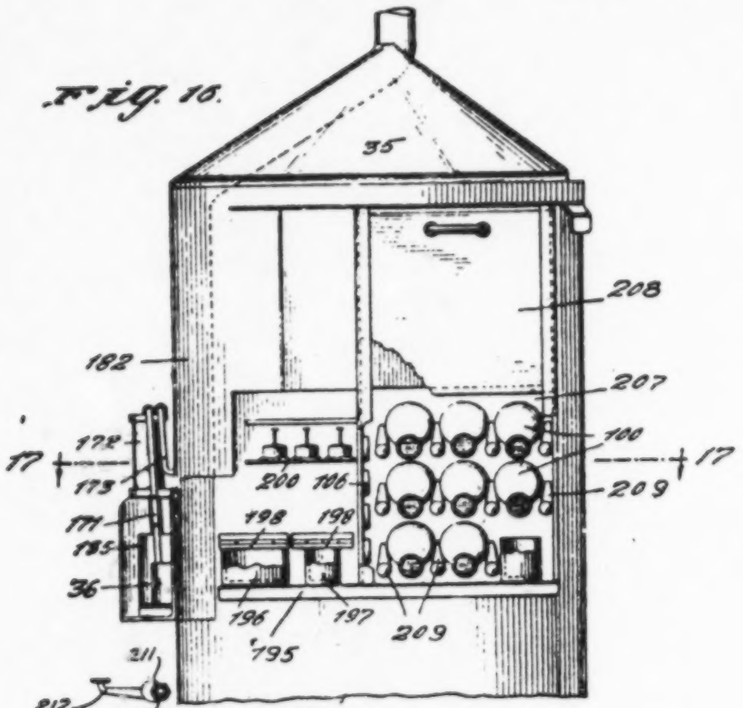
June 1, 1937. H. McCORNACK 2,081,947

DAIRY PLANT

Filed March 1, 1933 12 Sheets-Sheet 9

Fig. 16.



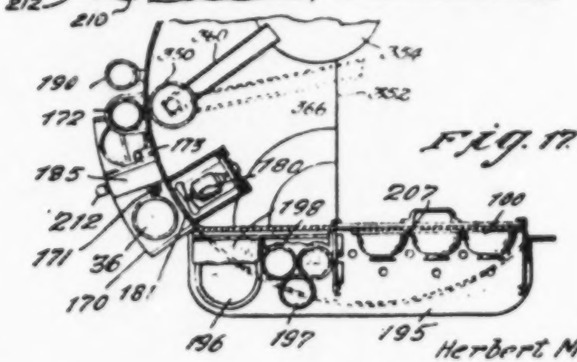


Fig. 17.

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June 1, 1937. H. McCORNACK 2,081,947

DAIRY PLANT

Filed March 1, 1933 12 Sheets-Sheet 10

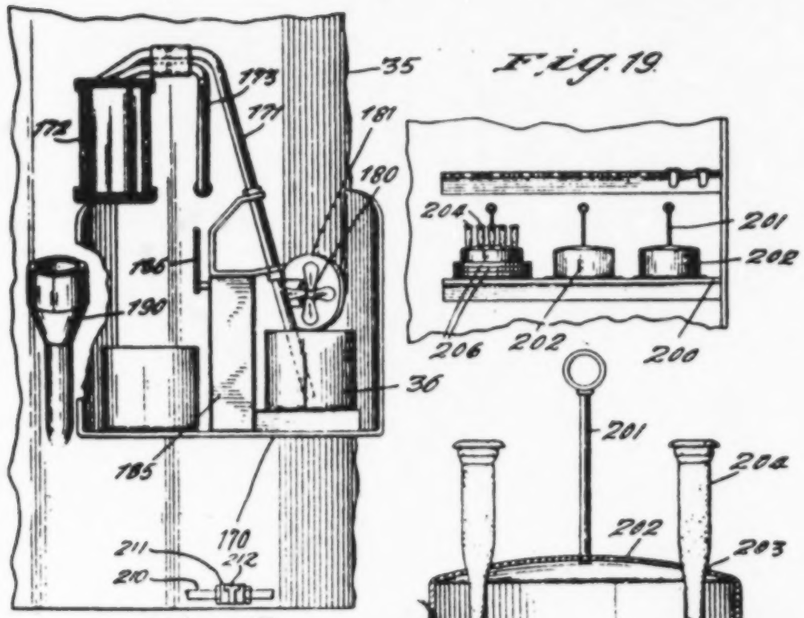


Fig. 18.

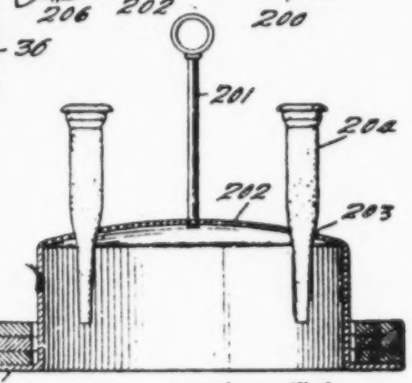


Fig. 20.

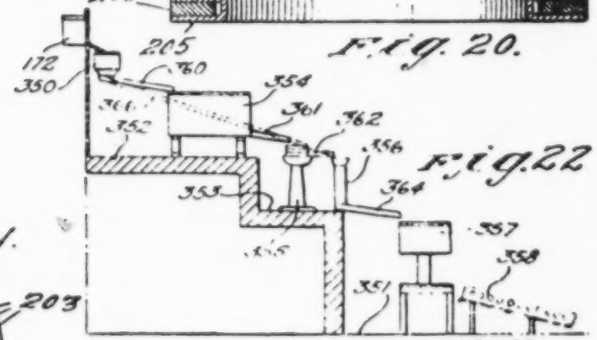
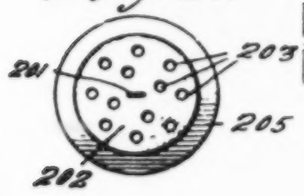


Fig. 22

Fig. 19.

Fig. 21.



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June 1, 1937. H. McCORNACK 2,081,947

DAIRY PLANT

Filed March 1, 1933 12 Sheets-Sheet 11

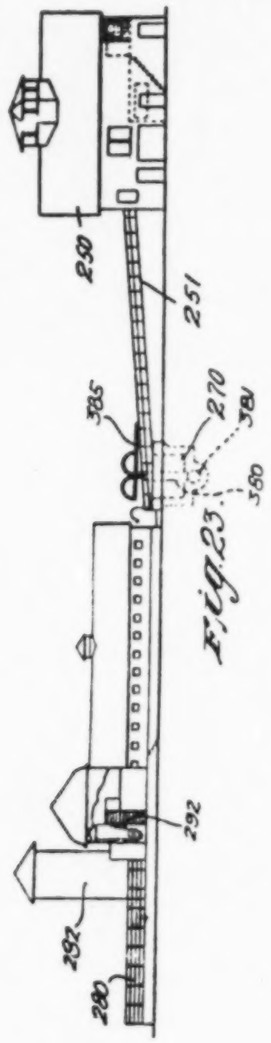

Fig. 23.

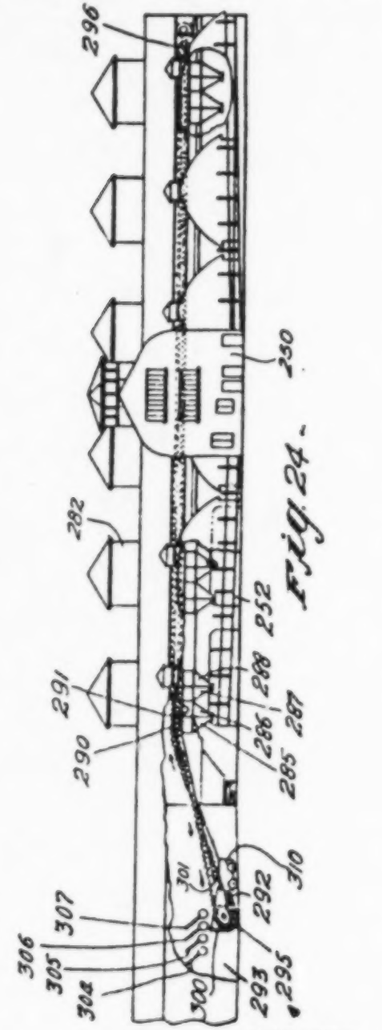

Fig. 24.

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June 1, 1937. H. McCORNACK 2,081,947

DAIRY PLANT

Filed March 1, 1933 12 Sheets-Sheet 12

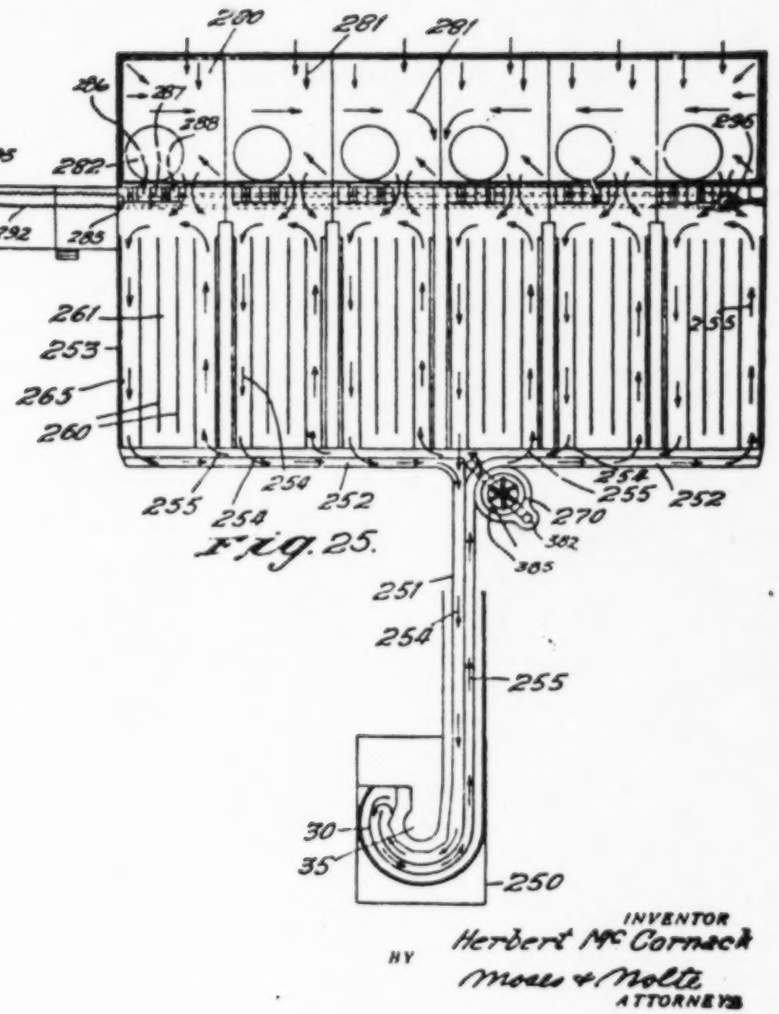

Fig. 25.

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UNITED STATES PATENT OFFICE

2,081,947

DAIRY PLANT

Herbert McCornack, Glen Ridge, N. J.

Application March 1, 1933, Serial No. 659,852

12 Claims. (Cl. 21—58)

My invention relates to improvements in facilities for sheltering, feeding, milking cows, caring for the milk and conserving the fertilizer values of the manure.

An important feature of the invention comprises improvements in plants for milking cows by machine, particularly that type of milking plant in which the cows enter the milking stalls from the side opposite to the milking machine operator. This part of the invention is designed especially as a complement to the milking machine disclosed in my Patents No. 1,859,213 and No. 1,859,214, although it may be employed with other types of milking machines.

The comprehensive objects of my invention are to save labor, to keep stable and human impurities out of the milk, to increase milk production, to promote the health of the cow's udder by facilitating the application of the calf-like agitation of the milking machine disclosed in my patents aforesaid, to provide improved arrangements for sheltering and feeding the cows, for handling the milk and for disposing of the manure and utilizing the valuable constituents thereof.

I attain these objects by the following novel features:

A basic novel feature of this dairy plant is the arrangement of milking stalls by which the cows' heads overlap the hips of the cows in front of them on the side next to the milking machine operator. By this arrangement the distance which the operator has to travel from cow to cow and from the cows to the point where the milk is emptied is made considerably shorter than in prior practice. An important provision in this overlapping arrangement of stalls is the interposition of sanitary shields or guards between the hips of the cows and the overlapping heads of the cows at their rears. Another important feature in this connection is the provision of feed boxes mounted upon said shields which serve not merely as feed boxes, but, in this overlapping of stalls, provide protection for the operator from the heads of the cows at the rear when he is milking.

Another feature which contributes essentially to the overlapping arrangement of milking stalls is the milking bench, which elevates the cow's udder to a height about four feet above the operator's floor, where the operator standing erect can reach it and attach the milking machine and which also lifts the feed box and the cow's head out of the way of the operator while he is milking the next cow.

Another feature of this plant is the preferred circular arrangement of milking stalls and provision within the circle of stalls for emptying and weighing the milk and transferring it to the milk room, thus reducing the travel of the milking machine operator to the minimum.

Another feature of improvement in this dairy plant is the provision of means for controlling the entrance of the cows into the milking room. This consists in its preferred form of an entrance door and a curtain or other suitable form of barrier across the approach to the entrance door and a pull cord, electric switch or other means in the milking room by which the milking machine operator simultaneously opens the entrance door and drops the curtain, and reversely, means being also provided on the approach side of the entrance door by which the door is closed and the curtain is raised for the next cow. In this arrangement, as the entrance door is opened to let in the cow which is about to enter the milking room, the two-part curtain, which is weighted, falls about the middle of the cow's back and serves, not only to start her movement, but also to detain the cow which follows behind her until the entrance door is again closed and the curtain is again raised by the inspector. This scheme of control serves to keep a cow at the entrance door promptly on call by the operator in the milking room.

Another feature of my improved milking plant consists of an entrance gate to the milking stall, preferably of spring sheet material and light in weight, so arranged that when it is drawn by the operator and pressed against the cow's hip it causes her to step over toward the shield and assume a position convenient to be milked.

Another provision in this connection is a ratchet or other means for locking the gate in any desired position which thus adapts this device to cows of different size.

Still another provision is an extension of the shield or other part of the stall in front of the cow's rear foot which is next to the operator and which not only protects the operator from the droppings of the cow but causes the cow to place this foot in a rearward position to facilitate the application of the machine.

Another feature of my improved dairy plant is the provision for dispensing with the unsanitary and expensive stall cocks of present practice and for greatly facilitating the attachment of the milker unit to the cow. This is effected by an automatic control of air inflow to the vacuum line which is accomplished by so shaping and so disposing the connection of the vacuum

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line with reference to the flexible stall tube which joins it with the milker bucket, that when the stall tube is detached from the milker bucket and is allowed to hang freely from the vacuum pipe its weight serves to close the air inlet to the vacuum line and, reversely, when the stall tube is attached to the milk bucket, the inlet being thus relieved sufficiently from its weight, opens and the air flows into the vacuum line. This automatic control of the air inflow to the vacuum line is made possible by the elevated milking bench and by such location of the vacuum line connection that when the stall tube is suspended from the vacuum connection it swings clear of the operator's floor.

Another feature of improvement is the provision for so hanging up the surcingle of the milker unit as it is taken from the outgoing cow that the incoming cow, when she enters the milking stall walks directly under the surcingle located in convenient position to be attached.

Another feature is the provision of water pipes so arranged that they discharge water against and flush the surfaces of the sanitary shields and also flush the milking benches and the gutters. Each individual shield may be flushed separately but preferably the shields are flushed simultaneously by means of a common valve. It is also provided that the cow's lanes and their manure gutters are sprayed and flushed from lateral pipes in the same way.

Another feature is the arrangement of the manure gutters of the dairy plant so that they are located beyond the cows on the side opposite to the operator. The advantage of this arrangement, over prior practice, is that the milking bench and the cow lanes are more easily flushed and the cows do not have to cross the gutter in passing through the plant.

Another feature is the provision for keeping stable impurities and insects away from the milk when it is poured and transferred to the milk receiving room. This is accomplished by means of a fan which discharges pure air and maintains a clean atmosphere where the milk bucket is opened and the milk is poured and weighed and transferred to the milk receiving room.

Another feature is that this provision which protects the milk while it is being poured, weighed and transferred to the milk receiving room also efficiently ventilates the milk receiving room.

A general and comprehensive feature of improvement in this dairy plant is the convenient and concentrated location of all of the activities of the milking machine operator which makes it possible for one operator to use efficiently seven milker units simultaneously. By this concentration and convenience of the milking room facilities the work of the operator is so greatly abbreviated that he can give close attention to the functioning of the several milker units and can apply to each cow for a longer period of time the calf-like treatment of my patented milker with great advantage to milk production and to the health of the cow's udder. This great economy of effort and improvement in efficiency is effected by the combination of plant facilities, the arrangement of the milking stalls, the facilities for handling the cows, the means for flushing the plant and the means for emptying and weighing and making record of the weight of the milk from each cow and transferring it to the milk room, also the convenient grouping within the circular arrangement of milking stalls, of the instrumentalities which control the activities of the plant, a funnel for disposing of the off-standard milk, a partitioned vat for sterilizing and rinsing the teat cups, a vat for washing all milking room utensils, crocks for sterilizing all rubber parts of the milking room equipment and a cabinet for sterilizing and racking the milk room utensils.

Another feature of improvement is accomplished by providing grades of approach which bring the cows, when in their stalls, to an elevation from which the milk is carried by gravitation through the various stages of treatment in the milk room, thus dispensing with pumps or human effort to accomplish this work.

Another important feature of my dairy plant is the provision of improved means for group feeding cows. In the milking room of this plant reservoirs are provided located above the feed boxes in each of the stalls which are automatically kept full of feed by means of a conveyer, preferably a flexible screw. This feed conveyor returns the overflow or excess supply of feed to the original source of supply. Means are also provided by which a given amount of feed can be transferred by the operator as needed from said reservoirs to the feed-boxes in their respective stalls. In the shelter stables there is also provided a distributing system for distributing ground feed, chopped feed, chopped bedding, etc. to the various stables. In connection with this distributing system is a storage room for the necessary feed and bedding supplies and, in the storage room, is provided a receiving hopper to which the different kinds of feed and bedding are conveyed by a truck and into which they are shoveled for distribution to the respective hoppers provided for their storage. At the rear end of each stable is a row of storage hoppers, a hopper for each kind of feed or bedding to be used, into which their respective kinds of feed or bedding are received from the conveyor at their upper ends and discharged from their lower ends into a truck from which they are distributed to the cows.

Another feature of improvement in dairy plants is the means for conserving and applying the fertilizer values of the manure. By a system of flushing the shelter stables, the milking room and the cow lanes both the solid and liquid values of the manure are carried into a catch basin and the considerable quantity of water thus brought into the catch basin is utilized to leach out the soluble values from the manure into a sump. From this sump the dissolved values of the manure are drawn, by a suction pump into a liquid manure spreader and applied to the soil in liquid form.

In the accompanying drawings, I have shown for purposes of illustration one preferred embodiment of my invention.

Figure 1 is a plan view of one form of milking room embodied in my invention;

Figure 2 is a vertical sectional view taken on line 2—2 of Figure 1, the milk receiving room being indicated diagrammatically in broken lines;

Figure 3 is a vertical sectional view taken on the line 3—3 of Figure 1, showing the inclined runway by which the cows approach the milking room;

Figure 4 is a vertical section on line 4—4 of Figure 1, looking in the direction of the arrows;

Figure 5 is a sectional plan view on line 5—5 of Figure 4;

Figure 6 is a vertical sectional view on line

6—6 of Figure 1, looking in the direction of the arrows;

Figure 7 is a detail view in elevation, showing the self-draining vacuum tank for the milking system and one of the feed measuring receptacles;

Figure 8 is a plan view on an enlarged scale showing one of the milking stalls and parts of another stall and also showing the entrance door.

Figure 9 is a plan view showing details of parts of one of the milking stalls on a still further enlarged scale;

Figure 10 is a view in elevation, parts being shown in vertical section, of one of the stall uprights and parts carried thereby;

Figure 11 is a plan view of the parts shown in Figure 10, partly in horizontal section;

Figure 12 is a horizontal sectional view on line 12—12 of Figure 10, the ends of the flexible wings being broken away;

Figure 13 is a view in elevation of one of the milking stall uprights showing the surcingle hung thereon;

Figure 14 is a view in elevation of one of the milk stalls as seen from the side where the operator stands and illustrating a cow therein;

Figure 15 is a detail vertical sectional view showing the automatic cut-off connection for the stall tube;

Figure 16 is a view in elevation showing the outside of the milk receiving room and showing the arrangement for holding the milking units not in use and also showing the receptacle for receiving the milk from the buckets;

Figure 17 is a partial horizontal section on line 17—17 of Figure 16;

Figure 18 is a view in side elevation, parts being shown in section, of the means for receiving the milk from the buckets and conveying it to the interior of the milk receiving room;

Figure 19 is a view in side elevation showing the holders where are kept the cup inflations and rubber sealing rings when not in use, a bracket for holding the metal parts of the cups being shown in section;

Figure 20 is a view in vertical section of one of the holders for the rubber parts;

Figure 21 is a plan view of the same with the rubber parts removed;

Figure 22 is a diagrammatic view in vertical section taken approximately on line 22—22 of Figure 1 showing the arrangement of the various milk handling instrumentalities by which the gravity flow of the milk is obtained throughout the milk receiving room.

Figure 23 is a diagrammatic side elevation of a complete dairy plant lay-out including the stables and milking house;

Figure 24 is a front elevation of the same, parts of the stables being shown in vertical section; and

Figure 25 is a diagrammatic, sectional, plan view of the lay-out shown in Figures 23 and 24.

Referring to the drawings in detail, in the particular embodiment of the invention illustrated the milking is done in a milking room 30 around which are located in circular arrangement a series of milking stalls for the cows, seven of such stalls being illustrated. These stalls are arranged on a milking bench 31 which is raised sufficiently above the operator's floor 32 of the milking room (Figure 2) as to bring the cow to a convenient height so that the operator may most readily inspect the cows' udders and teats and apply the milking units thereto. In the center of the milking room is a milk receiving chamber or room 35 and means are provided on the outer wall of this chamber for receiving the milk from the buckets, as indicated at 36 (Figures 1, 16, 17 and 18). The stalls are so arranged that the head of each cow overlaps the hind quarters of the cow ahead of her on the side towards the operator. In this way the cows stand in a position most convenient for the attachment of the milking units and are also brought as close together as possible so that the operator may reach all of the cows with the least amount of walking. Owing to this circular overlapping relation of the cows, a great economy of steps is secured and a single operator may readily take care of all the cows in a milking room of the size shown, attaching and detaching the milking units and pouring the milk from the buckets into the receiver 36, in which the milk from each cow is weighed and from which it is automatically passed to the interior of the milking chamber.

The stalls are defined by a series of shields 40, 41 and 42, all of the intermediate shields 41 being alike and serving as the rear shield for the cow on one side and the head shield for the cow on the other side. The shield 40 constitutes the rear shield for the cow nearest the entrance door and the shield 42 constitutes a head shield for the cow nearest the exit. Arms 43 and 44 are provided on the shields on the side of the cow toward the operator and the lower part of each shield is provided with a foot guard 45 which restrains the right hind foot of the cow, protects the operator from the same and also from the cow's droppings. The cow in stepping into the stall is caused by the operator to place her right hind foot in a rearward position behind the guard. The guard restrains movement of the foot, keeping the right leg out of the way and exposing the udder for ready attachment of the milking unit. Mounted about midway of each of the stalls on the side of the cow away from the operator is an upright 50 which has hinged thereto a pair of gates 51 and 52 which are preferably made of resilient material such as sheet metal. These gates may be actuated by means to be described and may be locked in closed position so as to retain the cow in the stall during milking. When the cow is to be introduced into a stall the gate 52 is closed and the gate 51 is opened, in which position it extends across the passage-way for the cow so that when a cow coming up such passage-way reaches the gate 51 she is stopped and deflected into the stall. The gate 51 is then closed and in closing it will press yieldingly against the cow's rear and gently push her into her proper place in the milking stall. After the cow is milked, the gate 52 is opened and the cow may thereupon pass out of the stall and along the passage-way to the exit.

The means for operating the gates 51 and 52 as shown in the drawings comprise rods 53 and 54 (see Figure 12) upon which the gates are fixed, the rods being journalled in bearing brackets 56 mounted on the uprights 50. The upper ends of the rods 53 are curved as shown at 56 and 57 in Figure 10 and terminate in pointed ends or teeth 58 and 59. Each of the uprights 50 carries a laterally projecting arm 60, on which are pivoted by means of a pivot 61 a pair of latch members 62, 63, which are yieldingly urged into latching position by springs 64. The latch member 62 is provided with a plurality of ratchet teeth 65 which are adapted to be engaged by the point 58 on the

curved arm 66 of the rod 64 carrying the entrance gate 54 by which means the gate may be locked in adjusted position depending upon the size of the cow. The latch 83 is provided with a single tooth 90 for engagement with the point 66 on the arm connected with the exit gate 53. Ordinarily, a single tooth 90 is sufficient for this gate, although a plurality of ratchet teeth may be provided for adjustment if found necessary. For closing the gates closing cords 70 and 71 are provided connected to the arms 66 and 67 and passing through a transverse hole 73 in horizontal arm 68 (Figure 11) around a guide pin 74 and depending through a hole 75 in the bottom of the arm 66. The ends of the cords are provided with grips 76 and 77 by which the milking machine operator may close the gates. The latches are provided with latch cords 80 and 81 which pass through a hole 82 in the arm 68 and are connected to a single grip 83 by which both latches may be simultaneously released when the gates are to be opened. The gates are provided with coiled springs 84, 85 which normally urge the gates into open position. Preferably a feed box 86 is mounted on the outside of each shield in position to receive the nose of the cow when in proper milking position in the stall. By placing a small amount of food in the feed box the cow is naturally attracted into proper milking position and is also quieted during the milking. The feed box also prevents the cow from lowering her head during the milking operation and possibly striking the operator while he is attaching a milking unit to the cow in the adjacent stall. Preferably means are provided for supplying feed to the feed boxes, such for instance, as the feed reservoirs 91 from which pipes 92 lead to the feed boxes. The feed reservoirs 91 are preferably provided with valve means indicated diagrammatically in Figure 9 for supplying a measured amount of feed to the boxes. Such valve means preferably comprise a rotary valve member 93 which may be of any suitable construction not necessary to be described in detail for delivering a measured quantity of feed, each valve member being provided with valve lever 94 to which is connected a feed valve cord 95 which passes through a hole 96 in the arm 68 and has at its end a hand grip 97 which the operator may pull whenever necessary to thereby supply a measured amount of feed to the feed box. The feed may be supplied to the feed reservoirs through a conveyor tube 98 which will be described more in detail below.

The cows in the stalls described may be milked in any available manner, even by hand, when desired. Any suitable machine milking apparatus may be used for the purpose but the present construction was particularly designed for use with the milking apparatus disclosed in my patents mentioned above. Briefly, this apparatus comprises a bucket 100 which is suspended from the cow's back by means of a surcingle comprising a flexible strap 101 and a spring bow 102. The spring bow 102 has at one end a hook 103 which is adapted to be engaged with one of the holes 104 in the strap 101. The bucket is provided with a suspending hook 106 adapted to engage with the spring bow. The bucket is provided with a lid 108 to which are attached the short flexible tubes 107 of the teat cups 108. The surcingles are arranged to be suspended when not in use upon pins 109 carried by the arms 68 as shown in Figure 13. When a surcingle is suspended in this position with the bow resting upon the pin 109 the cow entering the stall will walk directly beneath the same and stop when she reaches the shield at the forward end of the stall. The operator thereupon grasps the end of the spring bow to which the flexible strap is attached and drops the spring bow over the side of the cow away from him until he can reach the hooked end 103 of the spring bow which he thereupon draws beneath the cow's belly and hooks into one of the holes 104. The surcingle is now attached to the cow and the operator hooks the bucket upon the spring bow. For supplying vacuum to the milking machine, a vacuum main 110 is provided which extends under all of the stalls and is provided at each stall with a branch 111 terminating in a horisontally bent portion 112. Secured to the end of each of the horisontally bent portions is a vacuum hose or stall tube 113 which is adapted to be attached to the pulsator on the bucket lid. The connection between the stall tube 113 and the horizontal portion 112 of the vacuum pipe is shown in detail in Figure 15 and includes a nipple 114 which is cut off on an angle at the end as indicated at 115 so that when the stall tube 113 is detached from the bucket and allowed to hang down the vacuum supply will be cut off, whereas when the tube is lifted up and connected with the bucket the vacuum connection will be established to the bucket. It is possible to cut off the vacuum in this manner because of the height of the milking bench and of the bent over portion 112 above the operator's floor 32 which permits the tube 113 to hang down and cut off the vacuum without its end reaching the floor 32. The automatic vacuum cut-off between the tube 113 and the nipple 114 obviates the necessity for using a stall cock, which is expensive, requires frequent cleaning, and requires an additional manipulation on the part of the operator. When the operator has attached the tube 113 to the bucket and thereby placed the latter in communication with the vacuum he attaches the teat cups to the cows' teats and the milking proceeds as described in my aforesaid patents. When the milking is completed, the operator merely detaches the tube 113 from the bucket, permits it to drop down, thereby cutting off the vacuum, then removes the teat cups from the teats, unhooks the bucket from the surcingle, unhooks the surcingle and hangs it back on the pin 109 and pulls the hand grip 83, thereby opening both gates, which permits the cow which has been milked to pass out of the stall, the opened gate 51 serving to deflect the next cow into the stall. As soon as the cow has left the stall the operator pulls the hand grip 77, thereby closing the exit gate 53 at the front of the stall. The operator also pulls the handle 97 which discharges a bait into the feed box for the next cow.

The cows enter the milking room and reach the elevated milking bench 31 by means of a ramp 120. The cows are confined to a single line in their passage up this ramp by means of a guard rail 121 secured to the wall 122 by means of overhead braces 123. This leaves the lower parts of the cows exposed on the side away from the wall 122 without any interference by supports of any kind. Along the side of the ramp 120 is a horizontal floor 124 where an inspector can stand and conveniently wash off the cows' udders and inspect the teats as the cows pass up the ramp. When the cows reach the stalls they are, therefore, ready for immediate application of the milking machines. Entrance to the milking room is guarded by a swinging door 125 which is nor-

mally held closed by a pivoted latch 126 (Figure 6), this latch being controlled by a pull cord 127 which passes around through guides 128 above the stalls so that the milking operator can grasp the cord at whatever position he may be and release the latch when he has an empty stall ready for the reception of another cow. When the latch is released the door is pulled open by a cord 130 which passes around a pulley 131 (Figure 5) to a drum 132 fixed on a shaft 133. Also fixed on the shaft 133 above the cow ramp is a drum 134 which carries a weighted curtain 135, shown as made in two sections. The ends of each curtain section are also divided into two parts, each carrying a weight 136 so that four weighted tabs are provided on the bottom of the curtain. When the latch is released the weights draw down the curtain, at the same time winding up the cord on the drum 132 and swinging open the door 125. At this time there will be a cow standing beneath the curtain as shown in Figure 3 and the curtain descending on the cow's back will cause the cow to start forward through the door 125. As the cow passes out from under the curtain, the latter will be lowered in front of the head of the following cow, thereby stopping that cow until the door is again closed and the curtain rises. For closing the door 125 a cord 140 is provided which passes alongside of the passageway for the inspector standing on the floor 124. This inspector as soon as he sees that a cow has passed through the door 125 pulls the cord 140, thereby closing the door and raising the curtain so that the next cow will advance to a position behind the closed door ready to enter the milking room when the milking operator is ready for her.

The cows come in single file through a passageway from the cow barn and pass up the ramp 120, where they are washed off and enter one at a time through the door 125 as described. After each cow is milked, she passes out through the opened gate 52 of the stall where she has been milked and walks to the end of the circular passage outside of the stalls and is guided by a guide rail 145 around to the outside of the curved wall 146 of the milking room and passes down an inclined passage 147 to a runway 148 parallel with the ramp 120 by which she entered the milking room and returns through a passageway to the cow stable. A passageway 149 outside of the passageway 147 permits an operator to walk around when necessary for the purpose of cleaning the passageway 147 and to urge the cows along in case for any reason they hesitate on their way back to the cow stable.

For delivering food to the several food reservoirs 91 I preferably employ a conveying mechanism adapted to convey a continuous supply of food through the conveyor tube 98 so as to keep the reservoirs 91 full at all times, any surplus food carried by the conveyor being returned to the source of supply, as illustrated, an elevated food bin 150, into which both ends of the conveyor tube 98 open, as indicated at 151 and 152, respectively. Mounted in the conveying tube is the conveying member which, in the construction illustrated, is in the form of a flexible coiled spring member 153 which constitutes a screw conveyor. One end of this screw member is connected by a shaft 154 with a motor 155 by which it is continuously rotated. Properly comminuted food is placed in the bin 150 and is continuously fed by the screw 153 into the end 151 of the tube 98 and is carried around through the tube, enough of it being discharged into each of the food reservoirs 91 to keep the latter substantially filled at all times. The remainder of the food is carried back and discharged into the bin through the end 152 of the tube and is again circulated, food being added to the bin 150 from time to time to keep the same properly filled. In this way the operator is sure that all of the reservoirs 91 are filled so that whenever he requires a supply of food for any food box 86 he merely pulls the handle 97 opposite the corresponding stall and delivers a measure of food to the food box.

The vacuum pipe 110 which extends around under the stalls is preferably connected with a vacuum tank 160 of the type shown in my Patent Number 1,393,387. This vacuum tank has a connection 161 to a vacuum punp, not shown, and is also provided with a water connection 162 by which it may be readily flushed. At the bottom of the tank 160 is a pivoted door 165 which is held closed so long as the system is in operation but which drops open by gravity as soon as the vacuum is shut off, thereby automatically draining the tank. The accumulation in the tank of any milk which may be drawn into the vacuum system in the form of foam or otherwise is thus prevented.

For receiving the milk from the milking machine buckets, a receptacle 35 is provided which is mounted on scales on a shelf 170 on the side of the central milk receiving chamber or room 35. Means are provided for automatically weighing the milk and delivering the same to the interior of the milking room. The milk is drawn from the receptacle 36 through a pipe 171 to a glass chamber 172 to which is connected a vacuum pipe 173 (Figure 17). In order to keep flies and dust away from the milk receiving receptacle 36, a fan 180 is mounted in an opening 181 in the wall of the milk receiving room immediately above the receptacle 36. This fan draws fresh, cool air either from the inside of the milk receiving room or through the duct 182 and blows it out over the top of the receptacle 36. The scales for weighing the milk are indicated diagrammatically at 183 and means are provided adjacent thereto upon which the operator may enter the number of the cow, the condition of the cow's teats, and the weight of the milk given by the cow. As soon as the operator has weighed the milk and made the record stated, he pulls the handle 184 which turns on the vacuum to the pipe 173 and the milk is drawn from the receptacle 36 which is then ready to receive the milk from the next cow. In the event that any cow is found to have her udder in an unhealthy condition, the milk from that cow is not poured into receptacle 36 but a funnel 190 is provided into which such milk is poured and it passes to a suitable container in the milk receiving room. The milk withdrawn from the receptacle 36 is carried into the interior of the milk receiving room where it passes through suitable coolers, separators, pasteurizers, or any other desired apparatus to the bottling machine, such apparatus not being illustrated in detail herein. Preferably, the arrangement is such that the milk can pass by gravity through all of this apparatus.

Owing to the circular arrangement of the stalls and to the location of the milk receiving and weighing means in a position towards the center of the room and owing to the convenient arrangement of the controls for the stall gates

and other parts of the apparatus, it is possible for a single operator to handle the milking of the cows in all of the stalls, attaching and removing the milking units from the cows, and to pour the milk from the buckets into the receptacle 38, weigh the same and make the necessary entries. Another operator standing on the floor 124 alongside of the cow ramp is able to clean and inspect the udders of all cows, and a third operator in the milk receiving room 35 is able to handle the milk received in that room throughout all of the operations performed therein to and including bottling. It is thus possible for three operators to do the entire work in a milking plant of the size illustrated.

Means for washing and racking the parts of the milking units are preferably provided on the outer wall of the milk receiving room 35. As here illustrated, a shelf 196 is provided on which are receptacles 196 and 197 for washing solutions, hinged covers 198 being preferably provided for these receptacles. Above the shelf 196 is another shelf 200 carrying holders 201 for the rubber parts of the units. These holders (Figures 18, 19, 20) comprise inverted dome-shaped members 202 having holes 203 in their tops into which are placed the teat cup inflations 204. The dome-shaped members have outwardly extending bottom flange 205 upon which the rubber sealing washers 206 for the bucket lids are placed. The holders 201 carrying these rubber parts may then be dipped into the solution receptacle 196 and all the rubber parts washed off, after which they are set on the shelf 200 to dry. A chamber 207 adapted to be closed by a sliding door 208 is provided to receive the buckets 189 and their lids 188, the buckets being supported in vertical position between brackets 209.

The maintenance of sanitary conditions within the milking room is important and I provide means by which this result may be accomplished with ease and certainty. A water main 210 extends around under the stalls and is controlled by a valve 211 which is preferably located adjacent to the milk receiving receptacle 36, it being provided with a foot pedal 212 for convenient operation by the operator. Connected with the water main 210 are branch pipes 215 having their ends bent over the top of each of the shields 48 and 61 so that when the water is turned on it will be delivered in such a way as to wash down the surfaces of such shields and keep them clean. The surface of the milking bench 31 slopes slightly outward as shown in Fig. 2 and around its outer margin is a gutter 216. The water flowing from the pipes 215, flushes off the surface 31 and carries all refuse into this gutter from which it flows by gravity to a suitable outlet. The gutter 217 also extends alongside of the passageway 147. Preferably all this wash water and refuse carried thereby, together with any liquid excrement discharged by the cows are washed through a suitable duct to a manure basin to be described.

In Figures 23, 24 and 25 I have shown diagrammatically a complete layout of a dairy plant embodying the features above described together with an arrangement of stables provided with a novel feed distribution system and manure drainage system. The milk house 250 contains the milking room 30 of the form already described which is located on the second floor of the milk [illegible]ome and which the cows reach by a ramp 251 [illegible]ich forms a continuation of the ramp 120 in the milk house. The milk coolers, separators, pasteurizers and bottling machines are located in the milk receiving room 35 which extends to the ground floor of the milk house so that the milk which is delivered on the second floor can pass by gravity through the various stages of treatment to final bottling and delivery. All pumps or other instrumentalities for elevating the milk during treatment are thus avoided, this being made possible by performing the milking at a raised elevation which is reached by the cows walking up a ramp. As shown diagrammatically in Figures 1 and 22, the milk passes from the receptacle 172 into the interior of the milk receiving room where it is received by a strainer 356. The interior of the milk receiving room has a ground floor 351 and a series of elevated benches indicated at 352 and 353. Mounted on the upper bench 352 is a pasteurizer indicated diagrammatically at 354 and mounted on the bench 353 are a separator 355 and a cooler 356. On the ground floor 351 is mounted a bottler 357 from which leads a bottle conveyor 358. Various courses may be provided for the milk depending upon whether it is desired to pasteurize it, separate it, etc., but all of such courses are so arranged that the milk will flow by gravity without the necessity of pumping or lifting. For instance, the milk may be carried from the strainer 356 to the pasteurizer through a duct 360. From the pasteurizer the milk passes through a duct 361 to the separator, the cream passing from the latter through the pipe 362 to the cooler, while the skim milk may be discharged to a vat (not shown) through a spout (not shown). From the cooler the cream passes through a spout 364 to the bottler. If it is desired to pasteurize the milk and not to separate it, the milk passes directly from the pasteurizer to the cooler through a duct 365 shown in dotted lines in Figure 1. However, if it is desired neither to pasteurize nor separate the milk, it may be passed directly from the strainer to the cooler through a duct 366 shown in dotted lines. Other alternative arrangements may be made as desired. Ramp 251 connects with lanes 252 for the cows coming from the stables 253 and returning from the milk house to the stables, the paths of the cows passing from the stables to the milk house being indicated by arrows 254, the paths of the returning cows being indicated by arrows 255. The stables are provided with rows of stanchions indicated diagrammatically by the lines 260 between which are the manger spaces 261. The cows' stalls and the lanes for providing access to the stalls are so graded and guttered as to drain laterally towards the side walls of the stables where waterpipes indicated diagrammatically by the lines 265 are provided, and all of the surfaces and gutters also drain towards the lanes 252 at the front of the stables which are also suitably guttered and provided with waterpipes if necessary, so that all of the manure may be flushed, with or without the aid of brooms, towards the front of the stables. The lanes 252 slope, as indicated in Figure 24, in the general direction of the ramp 251, adjacent to which is located a manure basin 270. Back of each of the stables a cow yard 280 is provided, these cow yards being also graded so that the drainage will be in the general direction indicated by the arrows 281, between the central stables and to the manure basin. Adjacent to each of the stables a silo 282 is preferably located.

The provision of a manure basin into which all of the drainage from the stables, cow yards, milk rooms, and runways takes place is a valuable feature of my dairy plant. Owing to the fact

that all of these areas and passageways are flushed with wash water which carries or assists in carrying all of the manure both solid or liquid to the basin, it is possible by a proper construction of the basin to utilize such water to leach out all of the soluble values from the manure which constitute the most useful parts thereof, and thus produce a liquid manure which can be applied cheaply and efficiently to the pasturage immediately surrounding or near the dairy plant, and thus keep the same in a highly enriched condition. As shown diagrammatically in Figures 23 and 25, the manure basin 270 comprises a sunken cylindrical receptacle preferably of concrete in the center of which is a cylindrical strainer or filter 280 which communicates at its lower end with a sump 281 which communicates with a vertical passageway or well 282 shown in Figure 25. The manure and wash water is discharged into the concrete basin and the water and liquid parts of the manure are leached through the filter or strainer into the sump 281 from which they are pumped out through the well 282 by means of a suitable suction pump (not shown) and discharged into tank wagons or other receptacles or spread over the adjacent pasturage by means of any desired form of liquid manure spreader (not shown). The solid parts of the manure may be removed from the basin in any suitable manner as by means of a grapple (not shown) adapted to be suspended from a track 285.

Located near the rear wall of each of the stables is a series of hoppers 285, 286, 287 and 288 for holding supplies of the various kinds of feed which it may be desired to provide for the cows, such for instance as ground feed, chopped hay, beet pulp, etc. In order to keep these hoppers supplied at all times with the several feeds, I preferably provide the conveyor arrangement shown diagrammatically in Figures 24 and 25. As here illustrated conveyor troughs 290 and 291 extend throughout all of the stables, an endless conveyor 292 being provided which travels along these troughs from the feed storage room 293. The conveyor may be of any suitable construction, but I have found that an endless flexible member formed of spiral construction, like a spiral spring, running over pulleys 295 and 296 is satisfactory. In the feed storage room is a receiving hopper 300 into which the lower end of the conveyor dips and to which the different kinds of feed and bedding are conveyed by a truck 310. Corresponding to storage hoppers 285, 286, 287 and 288 are control levers 304, 305, 306 and 307 in the storage room, each of which by simple mechanism (not shown) serves to operate a series of outlets in the trough 290, preferably slide controlled in a well understood manner, which open into their respective hoppers. To operate this distributing system, the operator, for instance, by throwing control lever 305 opens simultaneously all outlets from trough 290 into the hoppers throughout the stables in series 286. He then shovels from the truck 310 the kind of feed to be delivered to hoppers 286. The conveyor carries the feed from receiving hopper 300 along trough 290 and discharges it from the trough into the first storage hopper in series 286 which is not full. When this hopper is full the feed overflows to the next hopper which is not full and so on until all of this series of hoppers are full. The excess supply is then returned back along trough 291 to discharge outlet 301 where it is discharged into the supply truck 310. When the overflow feed thus begins to return to the truck 310, the operator stops shoveling feed into the receiving hopper and the conveyor sweeps all of the feed from the receiving hopper 300 and from the conveyor troughs 290 and 291 and the distributor is then cleared and ready to handle another variety of feed. In this same way each of the several series of storage hoppers is filled with their respective kinds of supplies from the common receiving hopper 300 and the overflow excess is carried back to the storage room. It should be noted that with this system of distribution the hoppers are not necessarily filled in consecutive order but should any one or more of the hoppers, in the series, be drawn upon and emptied or partly emptied any or all of such hoppers will be successively refilled and the excess overflow returned to the source of supply. By this arrangement a single operator in the feed room is enabled to keep all of the stables supplied at all times with the various feeds required for the cows and, with the facilities here provided, also have sufficient time to distribute the feed to the individual cows.

While I have illustrated and described in detail certain preferred forms of my invention, it is to be understood that changes may be made therein and the invention embodied in other structures. I do not, therefore, desire to limit myself to the specific construction illustrated, but intend to cover my invention broadly in whatever form its principles may be utilized.

I claim:

1. In a milking plant having a station for the operator, a series of milking stalls each having a feed box at the head end thereof alongside the operator's station and each having confining members so arranged that the cow in one stall overlaps the hip of the cow in each stall except the rearmost is required to stand so that her hips extend alongside the head of the cow behind her and at the side thereof remote from the operator's station.

2. In a milking plant having a station for the operator, a series of milking stalls having confining members so arranged that the cow in each stall except the rearmost is required to stand so that her hips extend alongside the head of the cow behind her and at the side thereof remote from the operator's station, and each stall including a shield or guard interposed between the hip of the cow ahead and the head of the cow behind her.

3. In a milking plant having a station for the operator, in combination, a series of stalls, a runway for the cows at the side of the stalls remote from the operator's station, from which the cows enter the stall, the stalls being so arranged that the cow in each stall except the rearmost is required to stand so that her hips extend alongside the head of the cow behind her and at the side thereof remote from the operator's station.

4. In a milking plant having a station for the operator, a series of milking stalls each having a feed box at the head and thereof alongside the operator's station and each having confining members so arranged that the cow in each stall except the rearmost is required to stand so that her hips extend alongside the head of the cow behind her and at the side thereof remote from the operator's station, each stall including a shield or guard interposed between the hip of the cow ahead and the head of the cow behind her, and the feed receptacle of each stall being supported on said shield or guard of the stall ahead.

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5. In a milking plant, a series of milking stalls, each provided with a feed box, a feed reservoir for each of said feed boxes, a common source of supply, and a conveyor which withdraws feed from said source and keeps each reservoir filled with feed and returns the excess or overflow to the source of supply.

6. In a milking plant, a series of stalls arranged along a lane of approach, an entrance door to said lane, a latch for said door, a curtain arranged to close about the rear of the first cow at the entrance door for the purpose of detaining the cow following, a floor adjacent the stalls, means whereby the milking machine operator can, from the floor, unlatch said entrance door, and means automatically causing the door to be opened and the curtain to be closed upon the unlatching of the door.

7. In a milking plant, a series of stalls arranged along a lane of approach, an entrance door to said lane, a latch for said door, a curtain arranged to close about the rear of the first cow at the entrance door for the purpose of detaining the cow following, a floor adjacent the stalls, means whereby the milking machine operator can, from the floor, unlatch said entrance door, automatic means whereby the door is opened and the curtain is closed when the door is unlatched, and means on the approach side of the entrance door for closing said door and simultaneously raising said curtain for the approach of the next cow.

8. In a milking plant, a milking stall provided with an entrance gate so arranged that when it is being closed it presses against the cow's hip and causes her to step over to a position convenient to be milked from the side of the stall opposite the gate and means operable from the side of the stall opposite the gate for drawing the gate toward the cow and locking it at any desired position.

9. In a milking plant, a milking stall provided with an entrance gate so arranged that when it is being closed it presses against the cow's hip and causes her to step over to a position convenient to be milked and a guard mounted adjacent to the floor near the rear end of the stall so arranged that it extends in front of the cow's rear foot and causes her to keep her foot rearward on the operator's side in convenient position to be milked.

10. In a milking plant, a floor for a milking machine operator, a series of milking stalls so arranged that the heads of the cows overlap the hips of the cows in front of them on the side next to said floor, sanitary shields arranged at the rear of each cow and means for flushing all shields and the floor of the stalls.

11. In a milking plant, a raised milking room having a series of stalls arranged around a central space, a milk receiver in said central space, a milk receiving room containing milk treating devices at a lower level than said milking room and communicating with the receiver whereby milk taken from the cows in said milking room can be passed through said milk treating devices by gravity, and a ramp by which the cows may walk to said elevated milking room.

12. In a milking plant having a station for the operator, a series of milking stalls each having a feed box at the head end thereof alongside the operator's station and each having confining members so arranged that the cows in all the stalls are required to stand with their heads and shoulders substantially tangent to a common circle and that the hips of the cow in each stall are disposed alongside the head of the cow behind her at the side remote from the center of said circle.

HERBERT McCORMACK.

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APPARATUS FOR CLEANING AND VENTILATING BARNS AND STABLES FOR CATTLE

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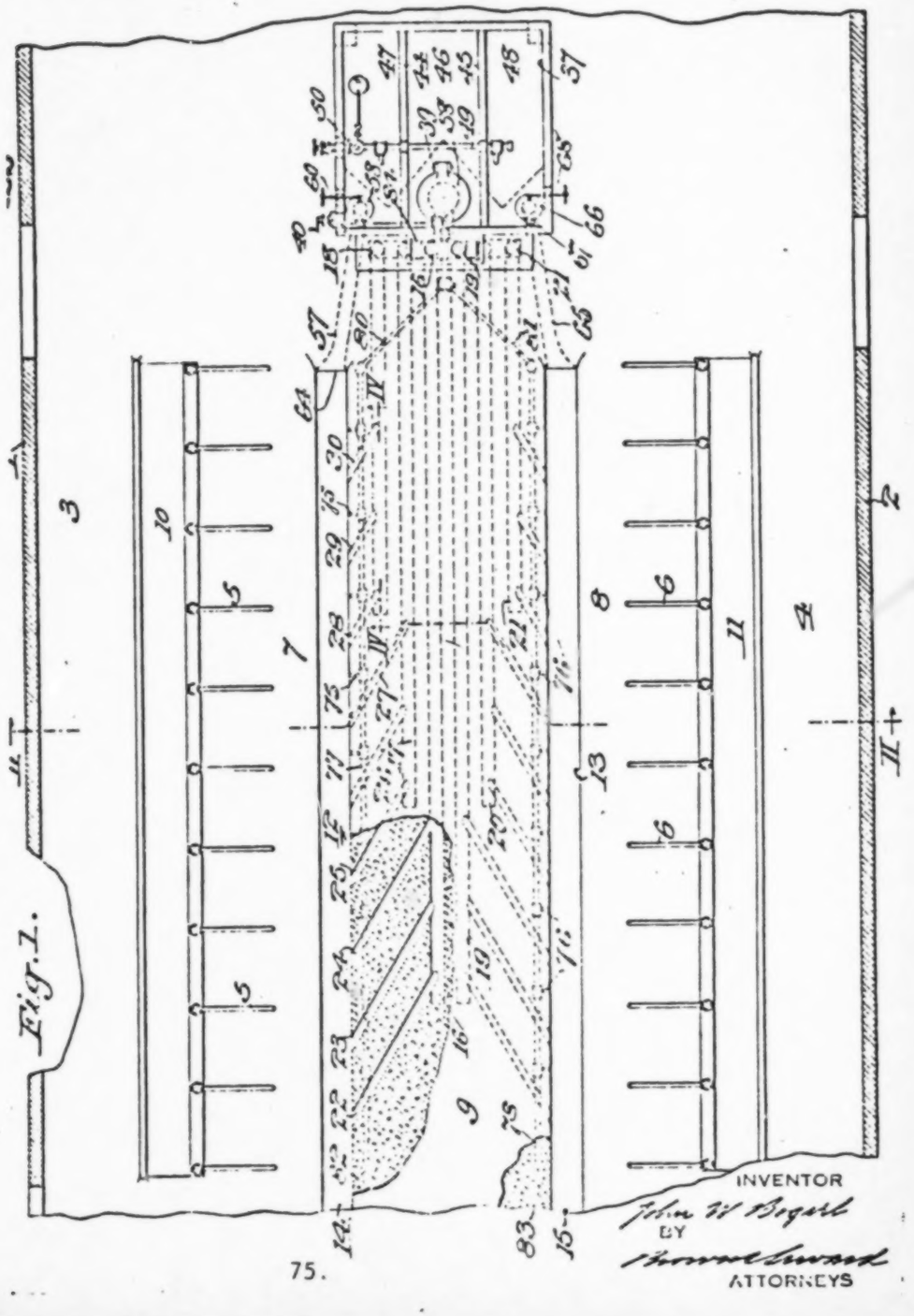

March 4, 1941. J. W. BOGERT 2,233,766

APPARATUS FOR CLEANING AND VENTILATING BARNS AND STABLES FOR CATTLE

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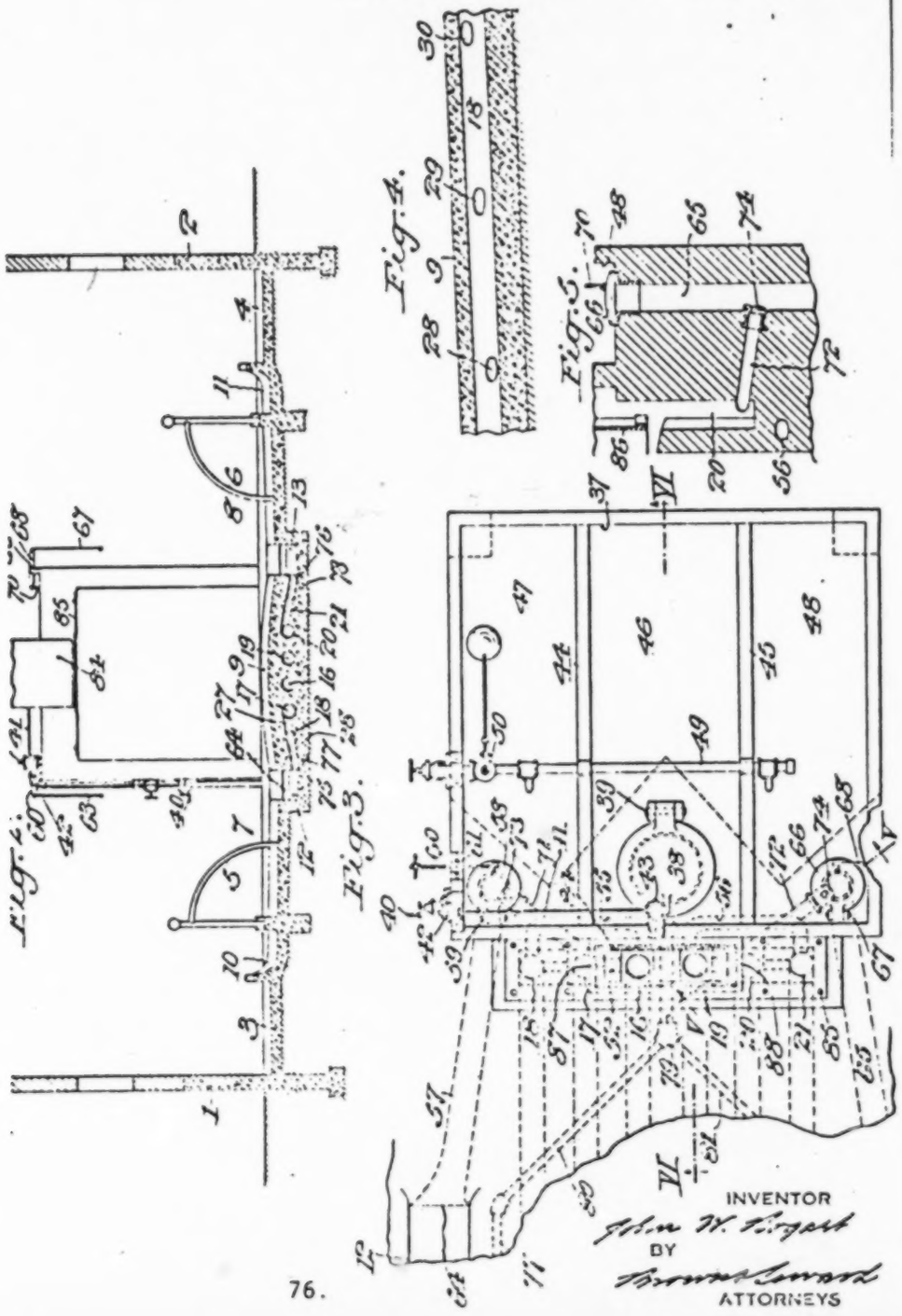

Fig. 3.

Fig. 4.

Fig. 5.

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Filed Feb. 19, 1938 3 Sheets-Sheet 3

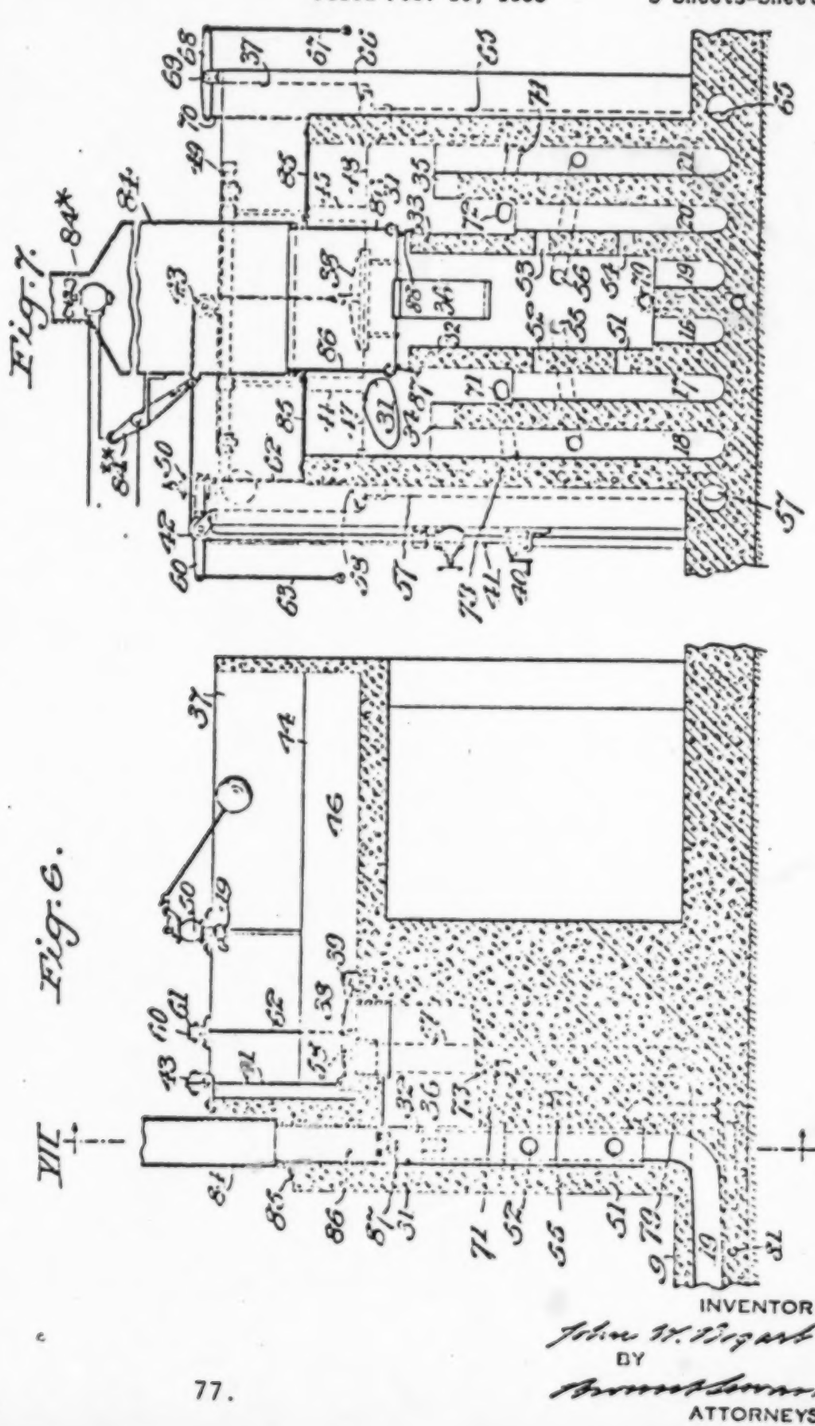

Fig. 7.

Fig. 6.

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Patented Mar. 4, 1941 2,233,766

UNITED STATES PATENT OFFICE

2,233,766

APPARATUS FOR CLEANING AND VENTILATING BARNS AND STABLES FOR CATTLE

John W. Bogert, Stamford, Conn.

Application February 19, 1938, Serial No. 191,384

21 Claims. (Cl. 119—16)

This invention relates to an apparatus for cleaning and ventilating barns and stables for cattle and the like, and has for an object to provide means for automatically cleaning the manure and urine gutter at the rear of the stalls by progressive action of a fluid cleaning medium.

Another object of the invention is to provide means for directing the cleaning medium to different portions of the gutter at various velocities so that the matter deposited in the gutter will be removed from certain portions of the gutter in advance of other portions of the gutter.

Another object is to provide means for controlling the flow of the fluid cleaning medium so that the matter in portions of the gutter will first be successively softened and semiliquefied and then the treated material in the gutter gradually removed without overflowing the gutter and finally flushing the gutter throughout its entire length.

Another object is to provide means for ventilating the barn or stable by way of the gutters through the cleaning medium means, alternating with its cleaning function, so that each portion of the gutter at the rear of each stall will be separately and individually ventilated.

Another object is to provide means for controlling the flow of exhaust air so that the amount of air exhausted is graduated according to the elevation of each portion of the gutter, there being greatest induced draft in the lowest portion of the gutter.

Another object is to provide certain improvements in the form, construction and arrangement of the several parts whereby the above named and other objects may effectively be attained.

A practical embodiment of my invention is represented in the accompanying drawings, in which,

Fig. 1 represents a detail horizontal section of a portion of a cattle barn or stable having my improved apparatus installed therein between oppositely disposed rows of stalls,

Fig. 2 represents a vertical section taken in the plane of the line II—II of Fig. 1 looking in the direction of the arrows,

Fig. 3 represents a detail plan view partly in section and on a larger scale of the fluid cleaning medium supply tank and adjacent mechanism,

Fig. 4 represents a detail vertical section of one of the ducts taken in the plane of the line IV—IV of Fig. 1 looking in the direction of the arrows,

Fig. 5 represents a detail vertical section taken in the plane of the line V—V of Fig. 3 looking in the direction of the arrows,

Fig. 6 represents a vertical section taken in the plane of the line VI—VI of Fig. 3 looking in the direction of the arrows, and

Fig. 7 represents a vertical section taken in the plane of the line VII—VII of Fig. 6 looking in the direction of the arrows.

The cattle barn or stable comprises side walls 1—2, feed alleys 3—4 adjacent the walls respectively, two series of stall-partitions 5—6 forming oppositely disposed rows of stalls 7—8, and a walk 9 interposed between the rows of stalls for the passage of the cattle to the stalls. A longitudinally arranged manger 10 is disposed between the stalls 7 and the alley 3 to extend along the head end of the stalls, while a similar manger 11 is located between the alley 4 and the row of stalls 8. A gutter 12 is interposed between the walk 9 and the row of stalls 7 for the reception of matter discharged by the cattle in the stalls, while a similar gutter 13 is located between the ends of the row of stalls 8 and the walk 9. The floors or bottoms of the gutters 12—13 are inclined downwardly to the left (Fig. 1) so that the liquefied or semi-liquefied matter will pass by gravity from the ends 14—15 of the gutters to a common reservoir or tank (not shown) where it may be stored for future use. The bottoms of the gutters 12—13 are also inclined transversely toward each other as shown in Fig. 2.

In order to bring the matter deposited in the gutters to a liquefied or semi-liquefied state so that it will readily move through the gutters to the outlets 14—15, I propose to apply to the matter at various points throughout the length of the gutters 12—13 predetermined amounts of water at different velocities. To prevent the fluid or simi-fluid mass from overflowing the gutters, the matter nearest the outlets 14—15 is first treated to liquefy it and then flushed out of the gutters while the remainder of the matter in the gutters is being treated simultaneously to soften and liquefy it so that it will flow by gravity through the gutters to the outlets 14—15. To accomplish this result I provide a series of longitudinal conduits 16—17 and 18 for feeding the gutter 12 while similar conduits 19—20 and 21 feed the gutter 13. The substantially horizontal portions of these conduits are concealed beneath the walk 9 and inclined downwardly towards their closed ends. The conduit 16 is provided with lateral branches 22—23 and 24 directed forwardly away from the conduit in position to enter the gutter at an angle to the path of travel and adjacent the bottom thereof. For instance, one end of the lateral branch 24 is joined at one portion of the top of the conduit 16, while one end of the lateral branch 22 is connected at one portion of the bottom of the conduit 16, and one end of the lateral branch 23 is coupled at an intermediate and central portion of the conduit 16. The other or discharge end of each of the lateral branches 22—23—24 pierce the side wall of the gutter adjacent the bottom. By this arrangement, the lateral branches are also given a slight downward inclination in a lateral direction toward the bottom of the gutter, thereby serving to empty the conduits and branches of all fluid medium when the flow from the reservoir ceases. The conduit 17 is also provided with lateral forwardly inclined branches 25—26 and 27 connected with the gutter 12 in the same manner as that above described with respect to the conduit 16 and its branches 22, 23, and 24.

The conduit 18 also has lateral forwardly inclined branches 28, 29, and 30 connected with the gutter 12 and disposed in the same manner as that described with respect to the conduits 16 and 17 and their lateral branches 22-27 inclusive. The conduits 19—20 and 21 also have sets of lateral forwardly inclined branches connected with the side wall of the gutter 13, each of which set of branches is disposed and arranged similar to that described with respect to the branches 22-30 inclusive of the conduits 16—17 and 18 respectively. The diameter of each of the branches is smaller than the diameter of its conduit, so that the combined areas in cross section of the several branches will be slightly less than the cross sectional area of their respective conduits, thereby providing a uniform distribution of the fluid medium with positive pressure over a predetermined length of gutter or within the length of gutter adjacent the set of branches of each conduit.

The open ends of the conduits 16-21 inclusive are turned upwardly into communication with a rectangular chamber 31 having partitions 32, 33, 34, and 35 (Fig. 7), of which the partition 32 separates the conduits 16 and 19 from the conduit 17, while partition 34 separates the conduit 17 from the conduit 18. The partition 33 separates the conduits 16 and 19 from the conduit 20, while the conduits 20—21 are separated by the partition 35. The partitions 32—33 extend upwardly into the chamber 31 and in close proximity to a passage 36 opening into the bottom of the reservoir 37. This passage 36 is closed by a cap valve 38 pivoted at 39 to hinge on the bottom of the reservoir, which valve is lifted to open the passage 36 by means of a crank 40 and a flexible connection 41 passing over guide pulleys 42—43 fixed on the walls of the reservoir. The valve 38 is closed on the passage by gravity or any well known or approved means. The reservoir 37 has partitions 44—45 extending upwardly therein from front to rear and on opposite sides of the valve 38, thereby forming three separate supply basins therein denoted by 46, 47, and 48.

A water supply pipe 49 furnishes water to the reservoir 37 and is controlled by a float operated valve 50 in the well known and approved manner. The valve 50 is adjusted so that the level of the water in the reservoir 37 will be well above the partitions 44—45 when the valve is closed and the supply cut off. When the valve 38 is opened the greater volume of water will pass from the reservoir and basin 46 through the passage 36 into the chamber 31 leaving the basins 47—48 full of water to the top of the partitions 44—45, the function of which will be hereinafter explained. As the water passes into the chamber 31 and first through the conduits 16—19 and their lateral branches, certain of it will then pass through ports 51—52 in the partition 32 and ports 53—54 in the partition 33 which in turn will feed the conduits 17—20 and their respective lateral branches. Simultaneously the conduits 18—21 with their lateral branches will be supplied with water from the chamber 31 by means of by-passes 55—56, respectively. From the foregoing it will be seen that upon opening the cap valve 38 the volume of water in the reservoir passing through the passage 36 into the chamber 31 will tend to force the water through the conduits 16—19 and their lateral branches with great velocity, thereby entering the gutters with maximum pressure which will move the matter therein toward the outlets 14, 15. The water leaking through the ports 51-54 inclusive will pass through the conduits 17, 20 and their branches to the gutters and serve to soften the matter therein before the water in the chamber 31 overflows the partitions 32—33. After the water has passed over the partitions 32—33 it will travel through the conduits and branches and flush the gutters. This result is accomplished by reason of the fact that the ports and the by-passes are constructed with substantially the same cross-sectional area as that of the lateral branches. Thus if the time period consumed and the amount of water passing through the conduits 16—19 is considered, the volume of water entering the chamber 31 will overflow the partitions 32—33 and gradually serve portions of the gutters controlled by the conduits 17—20 to a working or flushing pressure. Likewise, the water leaking through the by-passes 55—56 from the chamber 31 to the conduits 18—21 will serve to primarily soften the matter in the gutters before the water flows over the partitions 34—35 for the final flushing of the gutters. It is to be pointed out that the water in the reservoir and basin 46 is sufficient to completely fill the chamber 31 and overflow all partitions.

After the water has been discharged from the basin 46 through the several conduits, branches and gutters I find it advantageous to further flush the gutters separately throughout their entire length to the discharge end. This result is accomplished by means of a conduit 57 connecting the basin 47 with the gutter 12 and providing a cap valve 58 hinged at 59 on the bottom of the basin and adapted to close the opening to the conduit. This valve 58 is manipulated by means of a lever 60 pivoted in a bracket 61 fixed on the wall of the reservoir 37 and having one end connected to the valve by a link 62 while the other is provided with a pull cord or chain 63. When desired the valve 58 may be opened by manipulating the pull cord lever and link so that the water in the basin 47 will pass downwardly through the conduit 57 and out through the outlet 64 at the end of the gutter 12. A similar means is provided for flushing the gutter 13 by means of a conduit 65 connecting the basin 48 with the end of the gutter 13, which conduit is closed by a cap valve 66 hinged at 67 on the bottom of the basin 48 and opened by the manipulation of a pull cord or chain 67, lever 68 pivoted in a bracket 69 fixed on the wall of the reservoir 37 and link 70 connecting the valve and lever.

The conduits 57 65 are also in communication with the conduits 17—20 by means of by-

passes 71—72 respectively, so that while water is flowing into the conduits 17—20, it will also serve the end of the gutters connected with the conduits 57—65. These by-passes 71—72 are provided with check valves 73—74 respectively to prevent any loss of water from the conduits 57—65 while the valves 58—66 are open for end flushing of the gutters. The area of the opening 36 covered by valve 38 is limited to an area slightly greater than the combined areas of the branches of the conduits, and so gives a similar time element in washing the last portions of the gutters to that induced by the escape of the water from the ports and by-passes in the first part of the flushing through the conduits 16—19. Thus by more rapid opening of the valve 38, the water will pass from the reservoir and fill the chamber in a shorter period, at the same time furnish a greater washing pressure, if desired.

The varied resistance of the water used for final cleaning of the gutters lies mostly in the different lengths of the conduits and the position of their branches with respect thereto and to the gutters. The volume of water from the reservoir enters the chamber 31 and rises therein above the partitions 32—33 so as to overflow from one to the other of the conduits. Thus the greater water pressure is first given to the conduits 16—19 by reason of the heights of the partitions 32—33, over which the water must flow before passing into the conduits 17—20. When the water fills the conduits 17—20 it will rise above the partitions 34—35, which are of lesser height than the partitions 32—33 and flow thereover in a volume into the conduits 18—21.

The valves 38, 58, and 66 are each closed upon their respective openings by gravity or other suitable means and opened by manipulating pull cords or chains as desired.

The gutters 12—13 are also provided with inclined drains 75—76 respectively concealed beneath the walk 9 for removing urine or other liquid deposited in the gutters. Each of the drains 75 opens into the bottom of the gutter 12 at the end of each stall 7 and is connected to a longitudinal pipe 77, while each of the drains 76 opens into the bottom of the gutter 13 at the end of each stall 8 and connects with a similar longitudinal pipe 78, the ends of which pipes 77—78 are joined to a central pipe 79 by lateral pipes 80—81. The central pipe 79 is brought upwardly into open communication with the chamber 31, so that when the gutters are being cleaned these pipes and their drains are also being flushed. The pipes 77—78 are inclined downwardly toward the discharge ends of the gutters, while the discharge ends of the pipes are tapered and curved outwardly at 82—83 (Fig. 1) to drain by gravity into the outlets 14—15.

When the conduits 16 to 21 inclusive and their respective branches are not feeding water to the gutters 12—13 they are caused to function as a ventilating means. This means comprises a flue 84 extending upwardly from the cover 85 of the chamber 31 and provided with a baffle 85 depending therefrom. Check valves 87—88 are hinged to the bottom of the baffle 85 in position to coact with the upper ends of the partitions 32—33. The baffles allow the water to flow over the partitions but do not permit the air to return through the passages. In order to increase the action of the ventilating means, a motor driven ventilating fan 84* (Fig. 7) is installed in the flue 84, the electric energy of the fan motor being controlled by a switch 84** operated by the flexible connection 61 of the valve 38 in any well known and approved manner, so that when the valve 38 is opened to release the water in the basin 46, the electric energy will be cut off from the fan motor. When the valve 38 is closed the switch will be moved to restore the electric energy to the fan motor.

The action of the chamber 31 and conduits when using the apparatus as a ventilating means is reversed, since the main draft or suction is created in the flue 84 and baffle 85 between the partitions 32—33, the space therebetween being automatically closed by the hinged check valves 87—88. The air is drawn from the conduits 17, 20, 18, 21, and their respective branches by the ports 51-54 inclusive and by-passes 55, 56. Thus the conduits 16 and 19 are open to a maximum amount of suction created in the flue 84, and the conduits 18, 21, being of least length exact a minimum suction, while conduits 17, 20 draw an intermediate amount of suction.

Thus it will be seen that this apparatus may be alternately used as a ventilating means as well as a cleaning means, and is exceedingly efficient in the most frigid weather due to the fact that the coldest air is removed from the gutters and the greater part of it from the lowest portions of the gutters, thereby maintaining a barn or stable with more uniform heat. Furthermore the contaminated air of the gutters is kept to the rear by its direction of flow towards the gutter and drawn away from the animals, to be exhausted outside the barn or stable.

It will be understood that various changes may be resorted to in the form, construction, arrangement, and material of the several parts without departing from the spirit and scope of my invention, and hence I do not wish to be limited to the particular embodiments herein shown and described except as they may be included in the claims.

What I claim is:

1. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a cattle walk adjoining said gutter, and a plurality of conduits having longitudinal portions concealed beneath said walk and other portions bent upwardly, said longitudinal portions having outlets opening into one side wall of the gutter, said upwardly bent portions of the conduits emanating from a single source above and at one end of the walk, said outlets terminating at different positions throughout the length of the gutter for conveying a fluid medium thereto for cleaning the same.

2. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a cattle walk adjoining said gutter, and a plurality of conduits having longitudinal portions concealed beneath said walk and other portions bent upwardly, each of said concealed portions having a plurality of outlets opening into one side wall of the gutter and said upwardly bent ends of the conduits emanating from a single source above and at one end of the walk, said outlet terminating at different positions throughout the length of the gutter for conveying a fluid medium thereto for cleaning the same.

3. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a cattle walk adjoining said gutter, and a plurality of conduits having longitudinal portions concealed beneath said walk and other portions bent upwardly, each of said concealed portions having a plurality of outlets of relatively small diameter opening into one side wall of the gutter and spaced apart, said upwardly bent portions emanating from a single source above and at one end of the walk, said outlets terminating at different positions throughout the length of the gutter for conveying a fluid medium thereto for cleaning the same.

4. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a cattle walk adjoining said gutter, a fluid medium reservoir disposed above and at one end of the walk, and a plurality of conduits having longitudinal portions concealed beneath said walk and other portions bent upwardly, said concealed portions having outlets opening into one side wall of the gutter, said upwardly bent portions being connected with said reservoir, said outlets terminating at different positions throughout the length of the gutter for conveying the fluid medium thereto for softening and liquifying the matter therein and finally flushing the gutter to clean the same.

5. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a cattle walk adjoining said gutter, a fluid medium reservoir disposed above and at one end of the walk, a plurality of conduits having longitudinal portions concealed beneath said walk and other portions bent upwardly, said concealed portions having outlets opening into one side of the gutter, and a longitudinal duct concealed beneath the walk below the longitudinal portions and level of the gutter and connected thereto to drain the liquid therefrom, said upwardly bent portions and duct being connected with the reservoir for receiving the fluid medium for cleaning the same.

6. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a cattle walk adjoining said gutter, a fluid medium reservoir, conduits concealed beneath said walk and connecting said reservoir and gutter, said conduits being adapted to convey fluid medium to the gutter at different positions throughout its length for softening and liquefying the matter therein, and manually operable means in the reservoir for controlling the volume and velocity of flow of the fluid medium to the gutter for finally flushing and cleaning the same.

7. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a cattle walk adjoining said gutter, a fluid medium reservoir, conduits concealed beneath said walk and connecting said reservoir and gutter, said conduits being adapted to convey the fluid medium to the gutter at different positions throughout its length in progressive sequence for softening and liquefying the matter therein, and means in the reservoir for controlling the volume and velocity of flow of the fluid medium to the gutter for finally flushing and cleaning the same.

8. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a cattle walk adjoining said gutter, a plurality of conduits having longitudinal portions concealed beneath said walk and other portions bent upwardly, said concealed portions having outlets opening into one side of the gutter, said upwardly bent portions emanating from a single source above and at one end of the walk, said outlets terminating at different positions throughout the length of the gutter, and a flue adjacent the upwardly bent portions for exhausting the air from the conduits and gutter.

9. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a fluid medium reservoir, a chamber for receiving the fluid medium, a flue extending upwardly from the chamber and longitudinally inclined conduits connecting said chamber and gutter adapted to convey the fluid medium to the gutter at different positions throughout its length for cleaning the same, said chamber, conduits and flue being adapted to exhaust the air from the gutter throughout its length when the flow of fluid medium ceases.

10. In apparatus of the character described, a series of cattle stalls having a common gutter, a fluid medium reservoir, a chamber divided into sections for receiving a fluid medium, ports communicating with said sections for forming a leakage therebetween, and longitudinally inclined conduits connecting the sections and gutter adapted to convey the fluid medium to the gutter at different positions throughout its length for cleaning the same.

11. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a fluid medium reservoir, a chamber divided into sections for receiving a fluid medium, said chamber having a flue open to atmosphere, ports communicating with said sections for forming a leakage therebetween, and longitudinally inclined conduits connecting the sections and gutter adapted to convey the fluid medium to the gutter at different positions throughout its length for cleaning the same, said chamber, conduits and flue being adapted to exhaust the air from the gutter throughout its length when the flow of the fluid medium ceases.

12. In apparatus of the character described, a series of cattle stalls having a common gutter, a fluid medium reservoir, a chamber divided into sections of unequal areas for receiving the fluid medium, ports communicating with said sections for forming a leakage therebetween, and longitudinally inclined conduits connecting the sections and gutter adapted to convey the fluid medium to the gutter at different positions throughout its length for cleaning the same.

13. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a fluid medium reservoir, a chamber divided into sections of unequal areas for receiving the fluid medium, said chamber having a flue open to atmosphere, ports communicating with said sections for forming a leakage therebetween, and longitudinally inclined conduits connecting the sections and gutter adapted to convey the fluid medium to the gutter at different positions throughout its length for cleaning the same, said chamber being adapted to exhaust the air from the gutter through said conduits, chamber and flue.

14. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length and provided with a longitudinally inclined bottom for directing the fluid matter deposited therein away from the stalls, a cattle walk adjoining said gutter, a fluid medium reservoir disposed above and at one end of the walk, and a plurality of conduits having longitudinally inclined portions concealed beneath said walk and other portions bent upwardly, said upwardly bent portions being con-

nected with said reservoir and the end of each concealed portion terminating at a different position throughout the length of the gutter, each of said last named ends being provided with a plurality of branches, each of said branches opening into one side wall of the gutter and spaced apart for conveying the fluid medium to the gutter for softening and liquefying the matter therein.

15. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length and provided with a longitudinally inclined bottom for directing the matter deposited therein away from the stalls, a fluid medium reservoir, and longitudinally inclined conduits each having a plurality of branches at one end, a flue in communication with the conduits and open to atmosphere, said branches opening into the gutter at different positions throughout its length, the other end of each of said conduits being connected to the reservoir for conveying the fluid medium to the gutter through the branches for cleaning the same, said branches and longitudinal conduits also being adapted to exhaust the air through the flue at different positions throughout the length of the gutter when the flow of the fluid medium ceases.

16. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length and provided with a longitudinally inclined bottom for directing the fluid matter deposited therein away from the stalls, a cattle walk adjoining said gutter, a fluid medium reservoir disposed above and at one end of the walk, said reservoir being divided into sections, each section having a separately operable valve for discharging the fluid medium therein, one of said valves being adapted to control the discharge of a larger volume of fluid medium than the other valve, a longitudinally inclined duct concealed beneath said walk and below the level of the gutter, said duct having spurs opening into the gutter for draining the same and having one end connected to at least one section of the reservoir for flushing the same, a plurality of longitudinally inclined conduits concealed beneath the walk, each of said conduits having one end connected with said reservoir and the other end of each conduit terminating at a different position throughout the length of the gutter, each of said last named ends being provided with a plurality of branches inclined downwardly and forwardly and each of said branches opening into one side wall of the gutter in spaced relation for conveying the fluid medium to the gutter for softening and liquefying the matter therein and finally flushing the gutter to clean the same and a conduit leading from a section of the reservoir and controlled by a second valve, this conduit discharging into an end of the gutter.

17. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length and provided with a longitudinally inclined bottom for directing the matter deposited therein away from the stalls, a cattle walk adjoining said gutter, a fluid medium reservoir divided into sections each having a separately operable valve therefor, a longitudinally inclined duct concealed beneath said walk and provided with spurs opening into the bottom of the gutter for draining the same, said duct also being connected to at least one section of the reservoir, and longitudinally inclined conduits concealed beneath the walk and each having a plurality of branches at one end, a flue in communication with the conduits and open to atmosphere said branches opening into one side wall of the gutter at different positions throughout its length, each branch of the plurality being arranged at a different horizontal level and terminating adjacent the bottom of the gutter, the other end of each of said conduits being connected to the reservoir for conveying the fluid medium to the gutter for softening and liquefying the matter therein and finally flushing the gutter to clean the same, said longitudinal duct and conduits also being adapted to exhaust the air through the flue at different positions throughout the length of the gutter when the flow of the fluid medium ceases.

18. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a cattle walk adjoining said gutter, a fluid medium reservoir, a chamber for receiving the fluid medium, longitudinally inclined conduits concealed beneath said walk and connected with said chamber, and a plurality of laterally and forwardly inclined branches in each of said conduits in open communication with one side wall of the gutter to convey the fluid medium thereto, the outlets of said branches in each conduit being disposed at different positions with respect to each other throughout predetermined length of gutter for softening and liquefying the matter therein and cleaning the same.

19. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a cattle walk adjoining said gutter, a fluid medium reservoir, a chamber for receiving the fluid medium, longitudinally inclined conduits concealed beneath said walk and connected with said chamber, and a plurality of laterally and forwardly inclined branches in each of said conduits in open communication with one side wall of the gutter, each of said branches being of smaller diameter than the diameter of its conduit, the outlets of the branches in each conduit being disposed at different positions with respect to each other throughout predetermined length of gutter for distributing the fluid medium therein to soften and liquefy the matter in the gutter and wash portions of the gutter in progressive sequence.

20. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a cattle walk adjoining said gutter, a fluid medium reservoir, a chamber for receiving the fluid medium, longitudinally inclined conduits concealed beneath said walk and connected with said chamber, and a plurality of laterally and forwardly inclined branches in each of said conduits in open communication with one side wall of the gutter, each of said branches being of smaller diameter than the diameter of its conduit, whereby the combined cross sectional area of the branches in each conduit is slightly less than the cross sectional area of their conduit, the outlets of the branches in each conduit being disposed at different positions with respect to each other throughout predetermined length of gutter for distributing the fluid medium therein to soften and liquefy the matter in the gutter and wash portions of the gutter in progressive sequence.

21. In apparatus of the character described, a series of cattle stalls having a common gutter open throughout its length, a fluid medium reservoir, a chamber divided into sections of unequal

areas, ports communicating with said sections for forming a leakage therebetween, and longitudinally inclined conduits connecting the sections and gutter, said sections and ports being adapted to automatically control the pre-flow, the sequence of flow and the pressure of the fluid medium in the conduits and gutter, whereby the fluid medium will automatically pre-puddle and flush the gutter throughout its length by the continuous sequence of operation of the several conduits.

JOHN W. BOGERT.

Sept. 1, 1942. H. O. C. INGRAHAM 2,294,781

STALL AND STANCHION FOR DAIRY BARNS

Filed May 21, 1941

Fig. 1

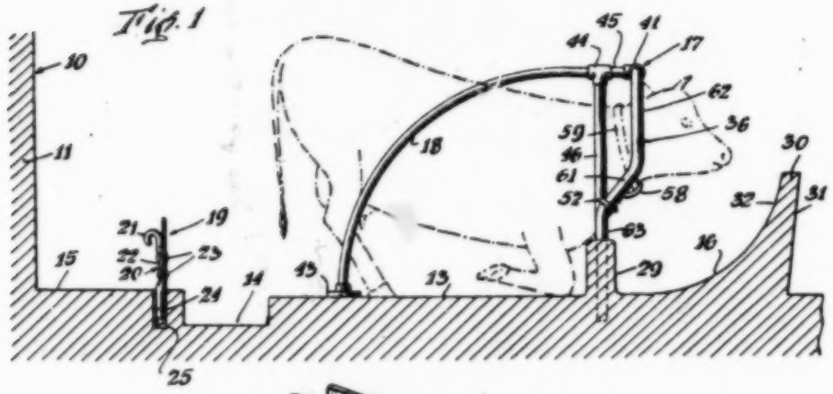

Fig. 2

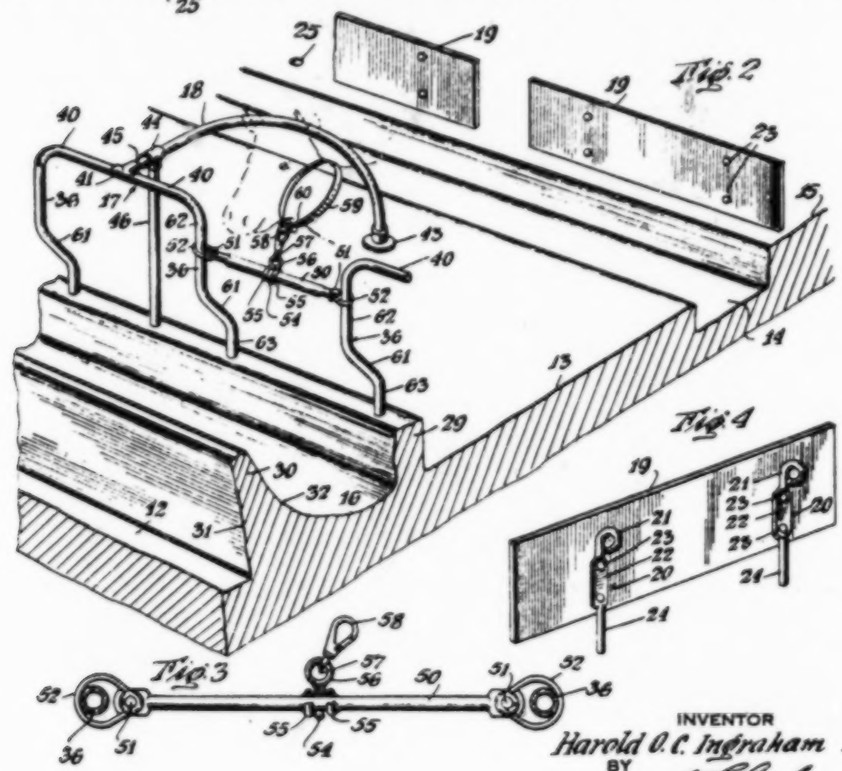

Fig. 4

Fig. 3

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STALL AND STANCHION FOR DAIRY BARNS

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Application May 21, 1941, Serial No. 394,414

3 Claims. (Cl. 119—119)

The present invention relates to dairy barns, and more particularly to a stall and stanchion therefor.

One object of the present invention is to provide a dairy barn having new and improved features of construction.

Another object is to provide a stall so constructed and arranged as to hold the cow in proper position, well up in the stall toward its manger and away from the litter aisle.

Another object is to provide a stanchion having novel and improved features of construction.

Another object is to provide a stanchion so designed as to limit the rearward movement of the cow, and to follow the normal movement of the cow while lying down or getting up.

Various other objects of the invention will be apparent from the following particular description, and from an inspection of the accompanying drawing, in which

Fig. 1 is a fragmentary vertical section through a stall embodying the present invention.

Fig. 2 is a fragmentary perspective of the stall shown in Fig. 1.

Fig. 3 is a detail view of a stanchion embodying the present invention, and

Fig. 4 is a perspective view of a removable shield, adapted to be positioned rearwardly of the litter gutter to prevent spreading of the litter from said gutter to the litter deck or aisle.

In the specific form of the invention shown, the dairy barn 10 is provided with side walls 11, and with two opposed rows of adjoining stalls extending the length of the barn and separated by a feed aisle 12. Extending lengthwise of the barn on each side of the feed aisle 12 is a manger 13, a stall floor 13, a litter gutter 14, and a litter aisle or deck 15 between the barn wall 11 and said gutter 14. A stanchion 17, to be hereinafter described, confines the cows in their individual stalls, and includes curved bracing rods or pipes 18, defining the sides of said stalls.

One difficulty commonly encountered in dairy barns of the above type is the tendency of the cow to step back upon the litter aisle 15 instead of standing in proper position in the stall. This tendency is increased by the standard practice of building the litter aisle lower than the stall floor and, in the case of chain stanchions, by allowing a considerable freedom of movement for the cow.

In accordance with the present invention, I provide a stanchion, which holds the cow well up toward the manger while in standing position. I also build the litter aisle on a higher level than the stall floor, so as to provide a rear gutter wall suited to confine the litter to the gutter, and provide a shield to further prevent the litter from falling or splashing onto the litter aisle. I have found, for instance, that the litter is more completely confined to the gutter by making the litter aisle 15 about two inches higher than the stall floor 13. This has the additional advantage of reducing the tendency of the cow to step back on to said aisle, because a cow dislikes to stand with her hind feet at a higher elevation than her front feet.

Fur further aid in preventing the spreading of the litter from the gutter 14 on to the aisle 15, a shield 19 is provided in the back of each stall sufficiently close to the gutter to prevent the cow from standing on the ledge between the shield and the gutter. The shield may be made of any suitable material, and may comprise a rectangular metal plate having rigidly secured to one side thereof a pair of brackets 20, each bracket being formed from a round bar, and having its upper end curved to form a finger loop 21, and its intermediate section 22 flattened for easy rigid attachment to the shield 19 by suitable fastening means, shown as rivets 23. The lower end section 24 of each bracket 20 projects downwardly beyond the lower edge of the shield plate 19 for free entry into a hole 25 provided in the litter aisle 15.

The attendant can easily mount the shield 19 in position shown in Figs. 1 and 2 by supporting said shield through the finger bracket loops 21, while lowering said shield to effect entry of the lower projecting bracket sections 24 into the corresponding aisle holes 25. These holes 25 are deep enough to permit seating of the lower edge of the shield plate 19 on said aisle, as shown in Figs. 1 and 2. A row of such shields extends along the litter aisle in back of the various stalls. The ends of adjacent shields may be spaced for convenience in handling.

In mounted position, the shields 19 prevent spreading of the litter from the gutter 14 on to the aisle 15. At the same time they act as a barrier obstructing rearward movement of the cow towards the aisle 15. When it is desired to clean the aisle 15, the shield 19 is easily removed to permit sweeping or shoveling of the litter from said aisle into the gutter 14.

The shield plate 19 may be of any suitable size for the purpose set forth. For instance, I have

found that a plate about twelve inches high is satisfactory for the purpose described.

The manger 16 is preferably in the form of a trough, having an inner wall 29 of substantially rectangular cross-section, serving as a curb for the stall floor 13, and an outer wall 30 substantially higher than said inner wall. The outer side 31 of the wall 30 is substantially vertical, while its inner side 32 curves downwardly and rearwardly towards the stall floor level to receive the feed.

As another feature of the present invention, the stanchion 17 is designed to effectively confine the movement of the cow without impeding her freedom of movement necessary for feeding or for lying down. For that purpose the stanchion support comprises a pair of spaced posts 36, which are preferably of tubular construction, and which have their lower ends imbedded in the manger wall 29. The upper end section 40 of each post 36 extends substantially horizontally, and connects into a branch of a T 41, the other branch being connected to the similar post structure of an adjoining stall. The bracing rod or pipe 18, preferably of tubular construction, has threaded or secured to its lower end a flanged collar 43 fixed to the stall floor by bolts or other suitable means, and has its upper end connected to a branch of a T 44. The other branch of this T 44 is connected to the stem of the T 41 by a nipple 45. An upright prop 46, preferably of tubular construction, has its lower end imbedded in the manger wall 29, and its upper end connected to the T 44.

In accordance with my invention I provide a bar stanchion 50, extending between the posts 36, and freely slidable therealong to permit up and down movement of the cow's head. This bar stanchion 50 is preferably made of tubular stock, and has its ends flattened and formed with respective holes to receive rivets or bolts 51. A collar 52, preferably in the form of a bent rod, is firmly secured to each end of the bar stanchion 50 by the bolts 51. The ends of said rod 52 may be bent to form eyes suited to receive said bolts. These collars 52 loosely encircle the respective posts 36, and thereby permit free slidable movement of the bar stanchion 50 along said posts.

For fastening the cow to the bar stanchion 50, there is provided a rotatable collar 54, loosely encircling the middle of said bar stanchion, and retained against axial movement therealong by a pair of bosses 55 affixed to said bar. The collar 54 carries a ring 56 to which is connected the eye 57 of a snap swivel 58. The snap swivel 58 is free to rotate about the eye 57 in response to movement of the cow's head.

The cow is provided with a halter or neck band 59 carrying a ring 60 into which the snap swivel 58 is snapped. The bar stanchion thus hangs from the cow's neck and slides vertically on the posts in response to corresponding movement of the cow. However, the connection between the halter 59 and the bar stanchion 50 is such as to afford only a limited forward and backward movement of the cow, and thereby holds the cow well forward in the stall.

A cow's body moves rearwardly a slight distance when lying down from a standing position and, when rising, moves forwardly about the same amount. I have found that this distance averages, for cows of various sizes, about 6½ inches. In order to provide ample freedom for this movement, I provide the stanchion posts 36 with offsets 61, inclined upwardly and forwardly of the stall between substantially vertical sections 62 and 63. The offsets 61 may begin at a height of about 16 inches above the stall floor, and extend to about 25½ inches above the stall floor, and are inclined to bring the sections 62 about 6½ inches ahead of the sections 63. The above dimensions, however, are only representative, and have been found satisfactory in a particular instance.

When the cow is standing, the bar stanchion 50 will extend between the upper forward vertical sections 62 of the posts 36. When the cow lies down, the bar stanchion 50 slides downwardly and rearwardly along the inclined offset sections 61 to the lower vertical sections 63 of the posts 36. When the cow rises from lying position, the movements of the bar stanchion will be reversed from that described.

By providing the inclined stanchion posts as above described, the bar stanchion 50 follows the natural movement of the cow without unduly restricting the same, but at the same time holds the cow in the desired forward position in the stall. This, in combination with the raised litter aisle 15 and the shields 19, ensures the disposal of the litter in the gutters 14, and maintains the litter aisle 15 substantially clear, an important feature in modern dairies supplying the better grades of milk, which are subject to rigid sanitary regulations.

As many changes may be made in the above design, and many apparently different embodiments of this invention may be made without departing from the scope of the claims, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense. The invention is only to be limited in accordance with the following claims.

What is claimed is:

1. A stall of the class described comprising a pair of spaced stanchion posts adapted to receive the head of a cow therebetween, a rigid bar stanchion extending between said posts and slidable thereon, a collar loosely mounted on said bar for rotational movement about the axis of said bar, bosses on said bar on opposite sides of said collar forming stops to confine said collar against axial movement, and a snap member being adapted to releasably engage a cow's halter for limiting the forward and rearward movement of the cow.

2. A stall of the class described comprising a pair of spaced stanchion posts, a rigid bar stanchion extending between said posts and slidable thereon, a member carried by said bar stanchion and adapted to be connected to a cow's halter, each of said posts having a lower vertical portion positioned to receive said stanchion when the cow is lying down, and an upper vertical portion to receive said stanchion when the cow is standing, said upper vertical portion being offset forwardly from said lower vertical portion by a distance corresponding to the normal forward movement of a cow in rising from lying to standing positions, said posts having an inclined intermediate portion joining said upper and lower vertical portions and positioned to guide the stanchion therebetween in a path corresponding to the forward and vertical movement of the stanchion required to accommodate the normal movement of the cow in rising.

3. A stall of the class described comprising a pair of spaced stanchion posts adapted to receive the head of a cow therebetween, a rigid bar stanchion extending between said posts and having eyes at its ends slidable on said posts, a collar loosely mounted on said bar for rotational movement about the axis of said bar, bosses on said bar on opposite sides of said collar forming stops to confine said collar against axial movement, and a member connected to said collar and constructed and arranged to attach said collar to a cow's halter for limiting the forward and rearward movement of the cow.

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Oct. 12, 1954 E. A. ANSTISS ET AL 2,691,359

MOVABLE FENCE SECTION FOR CORRALS

Filed March 23, 1950 2 Sheets-Sheet 1

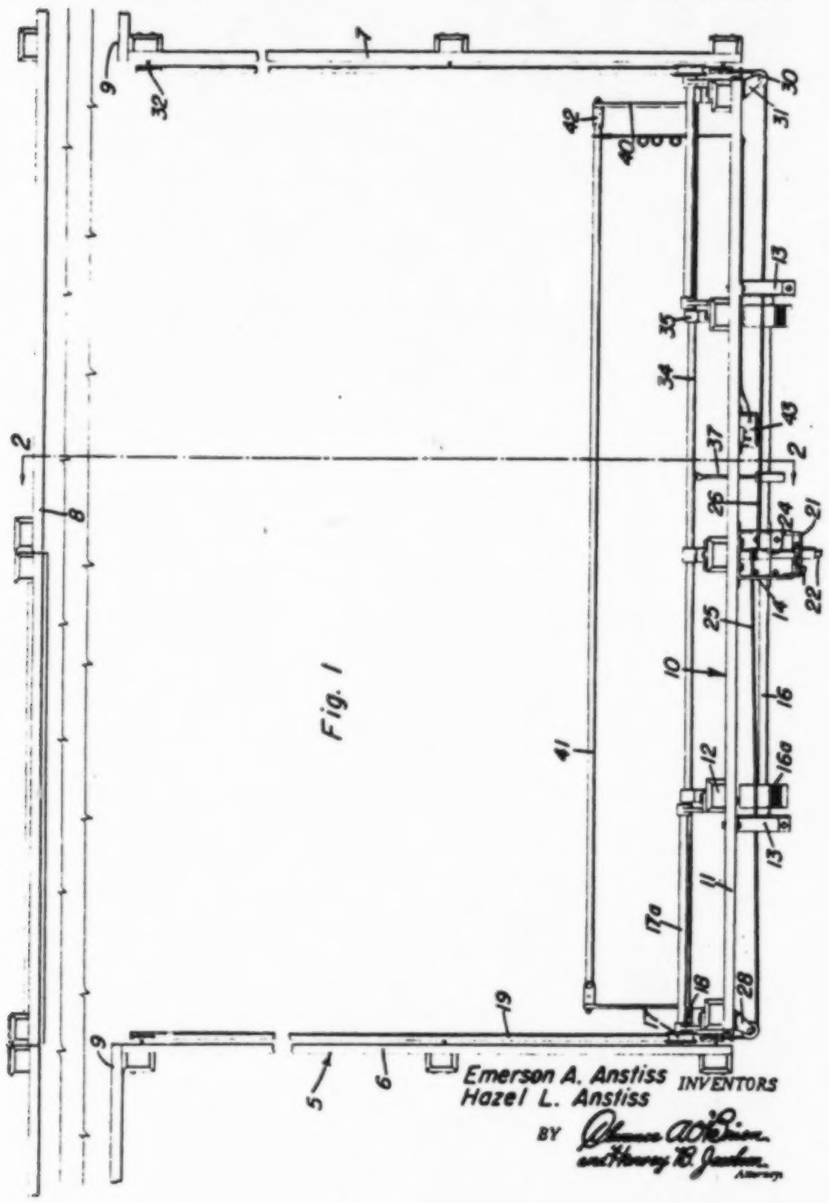

Fig. 1

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Oct. 12, 1954 E. A. ANSTISS ET AL 2,691,359

MOVABLE FENCE SECTION FOR CORRALS

Filed March 23, 1950 2 Sheets-Sheet 2

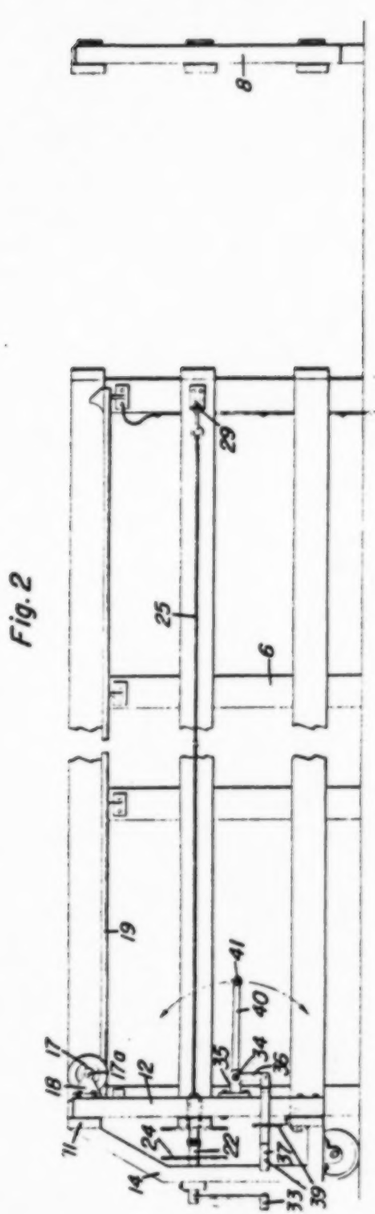

Fig. 2

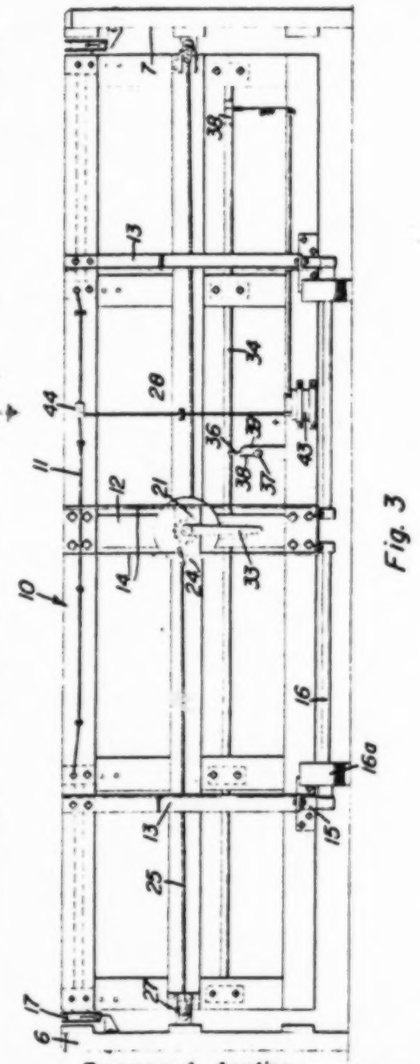

Fig. 3

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Patented Oct. 12, 1954 2,691,359

UNITED STATES PATENT OFFICE

2,691,359

MOVABLE FENCE SECTION FOR CORRALS

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Napa, Calif.

Application March 23, 1950, Serial No. 151,468

1 Claim. (Cl. 119—20)

1

The present invention relates to new and useful improvements in corrals and more particularly to a movable fence section for the corral to remove animals from the corral without necessitating a cattleman entering the corral.

In many instances when raising or otherwise handling stock it is necessary to collect the stock in a corral and then to move the stock singularly through a chute for loading, branding, vaccinating, or for other purposes and this work is difficult and sometimes dangerous as it usually necessitates one or more stock handlers to enter the corral to keep the stock moving.

Accordingly, it is an object of the present invention to provide a movable fence section for the corral which will force the stock toward the chute and out of the corral as the movable fence section is moved in that direction to thus avoid the objectionable procedure explained above.

A further object of this invention is to equip the movable fence section of the corral with an electrically charged wire or rod to prod the animals and to keep the same from collecting against the movable fence section.

A still further object is to provide an apparatus of this character of simple and practical construction, which is efficient and reliable in operation, relatively inexpensive to manufacture and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a top plan view;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a view in elevation of the outside of the movable fence section.

Referring now to the drawings in detail wherein for the purpose of illustration we have disclosed a preferred embodiment of the invention the numeral 5 designates a corral generally which includes a pair of side fence sections 6 and 7, a stationary end fence section 8 and chutes or runways 9 at the corners of the side and stationary end sections 6, 7 and 8.

The remaining end of the corral is closed by a movable fence section designated generally at 10 that is constructed to provide horizontal rails 11 and uprights 12 forming a rigid fence section or frame.

A pair of vertical brackets 13 are secured at

2

the rear of the movable fence section 10 adjacent its ends and a pair of vertical brackets 14 are also secured at the rear of movable fence section 10 at its center, each bracket having a bearing bracket 15 at its lower end in which axles or shafts 16 are journalled with wheels 16a rotatable thereon.

Grooved wheels or rollers 17 are rotatably supported on shafts 17a in brackets 18 at the upper end portions of the movable fence section 10 and which travel on tracks 19 secured to the inside of the stationary side fence sections 6 and 7 of the corral, the wheels or rollers 17 supporting the upper edge of the movable fence section 10 while the wheels 16a travel on the ground to support the main weight of the movable fence section.

A bearing bracket 21 is secured to brackets 14 for one end of a shaft 22 which has its other end journalled in an adjacent rail of the movable fence section 10. Shaft 22 is provided with flanges 24 forming a drum or winch to which one end of a pair of cables 25 and 26 are attached for winding on the drum.

Cable 25 extends toward the left of movable fence section 10 and around a pulley 27 rotatably supported in a bracket 28 at the left hand edge of the movable fence section 10, the cable then extending along the inside of stationary fence section 6 and attached to a bracket 29 adjacent one of the chutes 9. The other cable 26 extends toward the right hand side of movable fence section 10 and also around a pulley 30 journalled in a bracket 31 secured to the right hand edge of the movable fence section and thence along the inside of stationary fence section 7 for also attaching to a bracket 32 at the adjacent chute 9.

The outer end of shaft 22 is provided with a crank handle 33 for winding the cables 25 and 26 on the shaft to pull movable fence section 10 inwardly toward stationary fence section 8.

A shaft 34 is rockably supported in bearing brackets 35 at the inside of movable fence section 10, the shaft 34 extending from end to end of the movable fence section and is provided with a downwardly extending arm 36 to which the inner end of a push and pull lever 37 is pivotally attached and which extends outwardly of the movable fence section for rocking the shaft. Lever 37 is supported in a notch 38 at the upper end of a bracket 39 to prevent the lever from dropping downwardly. Arms 40 also extend from shaft 34 at the inner side of movable fence section 10 for supporting a horizontal electrically charged rod or wire 41 in a vertically swingable position. Insulators 42 connect the ends of rod

3

41 to the arms. The charged rod or wire 41 is connected to a battery 43 supported on movable fence section 10 or to other suitable source of current. The battery is grounded by way of shafts 17a, wheels 17 and tracks 19 and is controlled by a switch 44. Rod 41 is raised or lowered by lever 37 in accordance with the height of the animals confined in the corral to prod the animals and move them toward the exit 9 as the movable fence section travels in that direction.

Movable fence section 10 is supported on wheels 16a and 17, the latter traveling on tracks 19 and by winding cables 25 and 26 on winch 22 the movable fence section is pulled toward chutes or runways 9 to force cattle from the corral. The charged rod or wire 41 will prevent the cattle from crowding against the movable fence section.

In view of the foregoing description taken in conjunction with the accompanying drawings it is believed that a clear understanding of the device will be quite apparent to those skilled in this art. A more detailed description is accordingly deemed unnecessary.

It is to be understood, however, that even though there is herein shown and described a preferred embodiment of the invention the same is susceptible to certain changes fully comprehended by the spirit of the invention as herein described and the scope of the appended claim.

Having described the invention, what is claimed as new is:

A corral comprising a pair of stationary opposed side fence sections and a stationary end fence section, an exit for the corral adjacent the stationary end fence section, a movable fence section composed of horizontal rails and uprights, wheels journaled at the lower portion of the movable fence section for movement of the latter back and forth between the side fence sections and

4

relative to the stationary end fence section to move animals in the corral toward the exit, a winch rotatably supported on the outside of the movable fence section, cables secured to the winch for winding thereon and extending from the winch toward opposite sides of the corral and around the opposite ends of the movable fence section and extending therefrom longitudinally along the stationary side fence sections and attached thereto at a point adjacent the stationary end fence section, rails supported on the inside of the stationary side fence sections, wheels journaled on the upper end portions of the movable fence section for traveling on the rails to support the movable fence section upright during its traveling movement, a horizontal shaft journaled on the movable fence section, an arm fixed to the shaft and projecting inwardly of the corral, an electrically charged prodding bar fixed to the free end of the arm and positioned parallel to the movable fence section, a crank arm fixed to the shaft, and a handle secured to the crank arm and projecting rearwardly through the movable fence section for vertically adjusting the prodding bar.

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RÉPUBLIQUE FRANÇAISE

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BREVET D'INVENTION

P.V. n° 812.934 — N° 1.246.418

Classification internationale : — A 01 *k*

Installation d'enlèvement du fumier par courant d'eau.

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U.S. PATENT OFFICE

Société dite : MASCHINENFABRIK A. HOLZ KG résidant en République Fédérale Allemande.

Demandé le 14 décembre 1959, à 10 heures.

Délivré le 10 octobre 1960.

(*Demande de brevet déposée en République Fédérale Allemande le 15 octobre 1959, au nom de la demanderesse.*)

L'invention a trait à une installation d'enlèvement du fumier par courant d'eau.

Son but est de monter cette installation de manière à obtenir une économie de main-d'œuvre, aussi grande que possible, dans l'enlèvement du fumier des étables, avec la dépense la plus faible en frais d'installation de l'équipement de celle-ci. Elle a en outre pour but de permettre l'épandage du fumier préparé sur les champs, par la pluie ou autrement.

On connaît des équipements pour l'enlèvement du fumier par courant d'eau, comprenant des fosses de mélange avec agitateurs et désintégrateurs, réservoirs d'entreposage et canalisations, permettant de régler la concentration du fumier avant son enlèvement ou son émiettement par la pluie. Une rigole d'écoulement est également prévue. L'inconvénient de ces installations est qu'il n'existe aucune coordination précise entre la conception de l'étable, la rigole d'écoulement et l'équipement de préparation du fumier. De grandes quantités d'eau, par exemple, doivent ainsi être amenées dans la rigole d'écoulement quand, de temps à autre, les excréments doivent être poussés dans celle-ci, sur une distance plus ou moins grande.

Le problème à résoudre par l'invention est d'éviter ces inconvénients et de construire l'installation de manière à économiser la main-d'œuvre et en même temps préparer le mélange fumier eau, sous une forme particulièrement pratique et appropriée à son emploi comme engrais.

La solution suivant l'invention consiste à combiner à une stalle courte pour le bétail, un caillebotis possédant une partie supérieure élastique, pour recouvrir la rigole d'écoulement.

Suivant cette caractéristique, on adopte une stalle courte et non, comme on le fait d'habitude, une stalle moyenne ou longue, avec une rigole d'écoulement attenante. Cette stalle courte permet au fumier, aux ordures, et au purin de tomber directement dans la rigole et il suffit que celle-ci soit toujours remplie d'eau, au point que ce qui y tombe ne puisse s'y fixer. Il est essentiel que le caillebotis comporte une partie supérieure élastique, superposée à une partie inférieure rigide.

Quand on adopte une stalle courte, on doit compter que le bétail se trouve toujours sur le caillebotis. Afin d'éviter des blessures aux pattes, on pose sur celui-ci une partie élastique, à arêtes arrondies, afin que, quand le bétail passe dessus, il se trouve toujours sur des parties lisses élastiques et ne puisse se blesser à des bords tranchants.

Différentes possibilités existent pour la réalisation de la couverture élastique du caillebotis. On peut imaginer, par exemple, que la partie élastique reposant sur la partie rigide soit formée de pièces détachées rapportées.

Une forme d'exécution peut fort bien consister en ce que les parties élastiques rapportées, munies de pattes de deux côtés, entourent les parois de séparation du caillebotis et présentent, le cas échéant, une dépouille leur permettant, lors de la mise en charge, de s'appliquer sur celui-ci, et de se redresser lorsqu'on les décharge.

Afin qu'aucune obstruction ne se produise, lorsque les parties élastiques se rabattent, il est essentiel que celles-ci soient munies d'ouvertures d'écoulement vers le caillebotis sous-jacent, qu'elles recouvrent quand elles sont chargées.

En outre, il est indiqué que la face supérieure de la partie élastique destinée à recevoir la charge soit pourvue de nervures, de bossages, etc., pour empêcher le glissement.

Afin d'obtenir lors de l'emploi de matière synthétiques une élasticité suffisante, il est recommandable de munir les parties élastiques rapportées de parties métalliques enrobées, pour les fixer aux parties solides, et former le cas échéant un axe de rotation.

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Les parties élastiques peuvent en même temps être munies de points lumineux enrobés ou appliqués.

Une autre possibilité consiste à donner une forme en croix à ces parties rapportées, et à garnir les bords tranchants de la grille de surfaces de couvertures arrondies.

Une telle construction empêche les parties rapportées de basculer dans l'une ou l'autre direction, lorsqu'elles sont mises en charge, car il y a toujours d'autres bords, augmentant la résistance au renversement, perpendiculaires à ceux qui basculeraient éventuellement. Afin d'obtenir une élasticité suffisante, pour autant qu'on utilise des pattes rapportées, il est important que celles-ci dépassent sous le grillage et soient munies d'éléments de liaison bien connus, pour se chevaucher, se plier, se rabattre, afin de conférer aux parties surmontant le grillage l'élasticité voulue.

On doit compter qu'en employant des matières synthétiques, les parties surmontant le grillage ne se redressent plus, par suite du vieillissement. Quand la partie rigide, ou le grillage est entouré de tous côtés, c'est-à-dire, après l'application des parties élastiques rapportées, les parties sont également attachées par en dessous, et comme elles sont déjà attachées par la face de support on obtient ainsi une plus grande stabilité de ces éléments élastiques. On doit compter en effet, qu'avec une stalle courte, le bétail se couche également sur des parties de la grille, et qu'en tout cas on doit éviter des blessures éventuelles au pis provoquées par des bords tranchants.

Quand le grillage est construit de manière appropriée et a des dimensions suffisantes pour absorber les mélanges d'ordures et d'urines, il est en outre important que la rigole d'écoulement soit fermée par un registre manœuvré à la main, avant son entrée dans la fosse de mélange du fumier.

Ce registre manuel est pratique, car l'écoulement doit se produire très rapidement, afin que tout ce qui se trouve dans la rigole soit entraîné par la vitesse du courant.

Une autre possibilité consiste à subdiviser une longue rigole à l'aide de plusieurs registres à main. Il est particulièrement opportun de faire déboucher dans la rigole d'écoulement les conduites d'eaux ménagères usées.

Afin de permettre un réglage précis de la concentration du fumier, il est important que la fosse soit équipée d'un dispositif d'agitation et de désintégration et que la citerne d'accumulation, raccordée par la canalisation et le registre, possède un agitateur. Le registre et le tuyau d'aspiration de la pompe, dont la distance au niveau du liquide est réglable permettent ainsi une circulation de liquide en circuit fermé, entre la fosse de mélange et la citerne.

Grâce à ce circuit fermé et au retour d'un mélange eau-fumier dans la rigole d'écoulement, il est possible d'obtenir une concentration de fumier quelconque.

Il est en outre opportun que la fosse de mélange ait une forme conique vers le bas, où sont logés l'agitateur et le désintégrateur, tandis que des palettes d'agitation, dont la distance à la surface du liquide est réglable, sont montées dans la citerne.

Un exemple de mise en œuvre de l'invention est représenté dans les dessins et d'autres caractéristiques de celle-ci ressortiront de ces derniers et de la description qui en sera faite. La figure 1 montre l'installation complète, consistant en stalles courtes, caillebotis et équipement de préparation du fumier, la stalle et le caillebotis se trouvant dans le même plan.

La figure 2 montre, vue de face, une forme d'exécution possible de pièces rapportées, en forme de croix, pour le caillebotis. La figure 3 est une coupe suivant la ligne I-I de la figure 2, vue en plan. La figure 4 montre un détail des pattes 27 opposées de la figure 3. La figure 5 indique, à côté du grillage, la possibilité de prévoir des parties élastiques rapportées dépassant le caillebotis. La figure 6 représente, les parties de la figure 5 renversées sous la charge, l'effort proprement dit exercé par le bétail n'étant pas indiqué.

Dans la figure 1, le bétail 1 se trouve dans une stalle courte 2, avec un caillebotis 3 attenant, qui recouvre la rigole d'écoulement 4. Le mélange eau-fumier passe, par le registre à main 5, dans la fosse de mélange 6 et de là, le cas échéant, dans la citerne-réservoir 7. Dans la fosse 6, se trouve un agitateur- désintégrateur 9. Dans la rigole d'écoulement peut aussi déboucher la conduite d'évacuation 10 des eaux ménagères usées. La caillebotis 3 consiste en une partie élastique supérieure 11 et une partie inférieure rigide 12.

Dans les figures 5 et 6, on a dessiné à côté du caillebotis, un élément constitutif de celui-ci; dans la figure 5, les parties élastiques supérieures sont redressées et dans la figure 6, ces parties, qui peuvent être des nervures en matières synthétiques, sont rabattues. Cette position ne peut résulter que de la charge imposée par les pattes des animaux debout.

Les figures 2, 3 et 4 montrent une pièce rapportée 24, en forme de croix, les surfaces de support 25 étant superposées au caillebotis 3. On a également indiqué schématiquement les pattes 27 dépassant le grillage.

Les points de croisement du caillebotis rigide sont maintenant recouverts et, en posant côte à côte plusieurs parties 24, en forme de croix on obtient un grillage pouvant supporter en permanence le bétail debout ou couché. Les pattes 26, qui, dans la figure 3, dépassent la largeur du caillebotis 3

peuvent être reliées entre elles par un recouvrement 27 comme le montre, dans la même figure, les petites branches de la croix. On obtient de cette façon une meilleure fixation sur le caillebotis.

Au lieu de ces recouvrements 27, il existe encore d'autres possibilités. On peut, par exemple, prévoir des bourrelets ou des trous où passent des boutons, etc.

Un moteur 13 commande l'agitateur-désintégrateur, et, en vue d'un épandage éventuel, un groupe moto-pompe 14 peut aspirer dans la citerne-réservoir un mélange eau-fumier et le refouler à l'extérieur, par la canalisation 16, vers l'installation d'arrosage. On peut également, au moyen d'un changement de réglage des vannes 17, 18 et 19, aspirer dans la fosse de mélange, par le tuyau d'aspiration 20. En outre, on peut aspirer dans le fond de la citerne-réservoir 7, par une vanne 21, dans le sens de la flèche 22, vers la fosse de mélange 6, puis de là, renvoyer le mélange dans le sens de la flèche 23 vers la citerne. De cette façon, on obtient une fragmentation du fumier présent dans celle-ci. Il est encore possible d'aspirer dans la cuve de mélange par le tuyau 20, réglable au niveau de la surface du liquide, pour envoyer celui-ci dans la rigole d'écoulement 4, afin d'augmenter la concentration du mélange, c'est-à-dire qu'on ne remplit plus la rigole d'eau claire, ou d'eau ménagère usée, mais qu'on prélève à un endroit approprié de la cuve une partie du mélange qui s'y trouve et qu'on la renvoie dans la rigole, afin d'augmenter sa concentration.

Le fonctionnement de l'installation est alors le suivant : le registre d'arrêt manuel 5 est fermé et la rigole, dont la pente est d'environ 1 à 2 %, est remplie d'eau ménagère usée, par l'ouverture d'une vanne se trouvant sous le tuyau de décharge jusqu'à recouvrir son point le plus élevé. Le remplissage de la rigole peut également se faire, comme indiqué ci-dessus, avec le mélange se trouvant dans la fosse, en modifiant le réglage des vannes. Le liquide traverse le caillebotis, les nervures en matières synthétiques, ou les parties élastiques se trouvant seulement dans la zone où passent les animaux. Ces nervures sont percées de trous ou de perforations afin de permettre en tout cas un écoulement facile à travers le caillebotis. Lorsque la rigole est suffisamment remplie, le registre à main 5 est fermé. Le mélange eau-fumier parvient à la fosse 6 et est désagrégé par l'agitateur-désintégrateur 8, puis envoyé, dans le sens de la flèche 23, vers la citerne-réservoir par le tuyau d'aspiration 20 après ouverture des vannes 17 et 19, la vanne 21 étant fermée. Lorsque le mélange doit être refoulé par la conduite 16, la prise dans la citerne se fait par le tuyau d'aspiration 15 et les vannes 19 et 18 ouvertes. On peut également prévoir un raccord au tuyau d'aspiration 20, et évacuer le mélange directement de la fosse de mélange dans des tonneaux à purin. Les palettes d'agitation 9 servent à éviter la formation de croûte de fumier, qui d'ailleurs peut être renvoyée dans le circuit indiqué par les flèches 22 et 23, en ouvrant les vannes 21, 17 et 19.

On peut indiquer, comme domaine d'utilisation de l'invention, toutes les possibilités d'installation d'un enlèvement du fumier par courant d'eau dans les étables, où les stalles courtes et les caillebotis permettent un grand nombre de combinaisons d'équipements correspondants tels que fosses de mélange avec ou sans citerne-réservoir.

RÉSUMÉ

Installation d'enlèvement de fumier par courant d'eau, consistant en une rigole d'écoulement, une fosse de mélange du fumier avec agitateur-désintégrateur, réservoirs et tuyauteries de raccordement permettant le réglage de la concentration du fumier avant la vidange ou l'arrosage remarquable notamment par les caractéristiques suivantes prises isolément ou en combinaisons :

Une stalle courte pour le bétail est reliée à un caillebotis, installé à l'endroit où stationne ce dernier, et recouvrant la rigole, celle-ci est barrée par un registre d'arrêt;

Le caillebotis consiste en une partie supérieure élastique et une partie sous-jacente rigide;

La partie élastique est formée de pièces détachées rapportées, posées sur la partie rigide, les pièces détachées sont cruciformes, et les bords tranchants de la grille présentent des surfaces portantes arrondies de couverture;

Les parties élastiques rapportées sont munies des deux côtés de pattes, entourant les parois de séparation rigides du caillebotis et présentant, le cas échéant, une dépouille, s'appliquant sur le caillebotis lorsqu'on les charge et se relevant lorsqu'on les décharge, dépassant sous le grillage et présentant des éléments de liaison connus, pour se chevaucher, se replier, se rabattre et conférer une élasticité satisfaisante aux parties élastiques surmontant le grillage.

Les parties élastiques rabattables possèdent des ouvertures d'écoulement vers les caillebotis rigides sous-jacents, recouverts lorsqu'ils sont chargés, et non ce qu'il existe des enrobages métalliques, pour la fixation aux parties rigides, formant éventuellement des axes de rotation, les parties élastiques formant la face supérieure possédant des points lumineux, enrobées ou rapportées :

La rigole d'écoulement est barrée par un registre manuel avant son entrée dans la fosse de mélange et les conduites d'évacuation des eaux ménagères usées débouchent dans la rigole;

La fosse de mélange du fumier est équipée d'un

dispositif agitateur-désintégrateur et la citerne-réservoir, raccordée par les tuyauteries de liaison, possède un agitateur; les vannes, le tuyau d'aspiration, dont la distance à la surface du liquide est réglable, et la pompe permettent l'établissement d'une circulation du liquide entre la fosse de mélange et la citerne-réservoir;

La fosse de mélange du fumier, a une forme conique vers le bas et possède un agitateur-désintégrateur, tandis que dans la citerne-réservoir sont installées des palettes d'agitation dont la distance à la surface du liquide est réglable;

La stalle courte et le caillebotis sont dans un même plan incliné vers ce dernier.

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Par procuration :

H. GOUVERNAL

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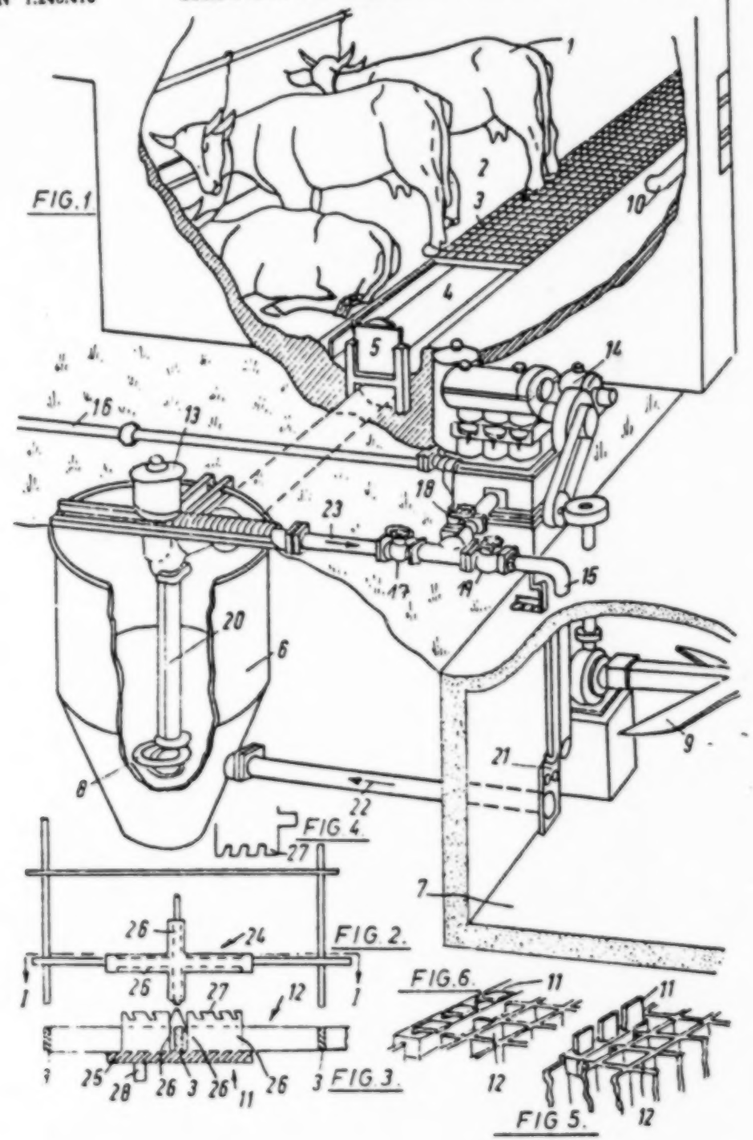


PATENT SPECIFICATION

DRAWINGS ATTACHED

914,649

Date of Application and filing Complete Specification Dec. 15, 1959.

No. 42621/59.

Application made in Germany (No. M43066) on Oct. 15, 1959.

Complete Specification Published Jan. 2, 1963.

SCIENTIFIC LIBRARY

JAN 22 1963

U. S. PATENT OFFICE

Index at acceptance: —Classes 86, C(1:2:18A2:18G5B:19X1:25); and 107, A.

International Classification:—B01f. E01c.

COMPLETE SPECIFICATION

Improvements in or relating to Manure Disposal Installations

We, OTTO HOEIZ and FRANZ HOEIZ, trading as the firm MASCHINENFABRIK A. HOEIZ K.G. of 14, Zeppelinstrasse, Wangen/Allgäu, Germany, both German nationals, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention concerns manure disposal installations.

The object of the invention is to provide an installation so that the maximum saving of labour in cleaning out animal houses such as cowsheds is achieved with minimum building and installation costs and, furthermore, to prepare the manure so that it can be sprinkled continuously over agricultural land or disposed of in some other manner.

According to the present invention a manure disposal installation comprises a drainage channel communicating with a mixing chamber having cutting and stirring means and a storage tank connected to the mixing chamber, a first, pipe being connected between the mixing chamber, storage tank and disposal means, and including valve means whereby the chamber can be selectively connected to either the tank or the disposal means, and including a further pipe connected directly between said chamber and tank.

The channel is preferably covered by a grid which lies flush with the floor surface of the stall, the grid including elastic members carried on the bars of the grid, such elastic members being cross-shaped and fitting over the bars of the grid. The said elastic members are preferably provided with downwardly extending flaps and upwardly extending lugs, the flaps extending on either side of the rigid bar members and interlocking with adjacent flaps and gripping the said rigid bars, while the upwardly extending lugs are adapted to yield resiliently when deflected by load, for example by being trodden on. Said lugs are adapted to resume their original shape and position as soon as any load applied to them is removed.

The drainage channel may be closable, at or near its discharge end, or additionally at intermediate points along its course, by means of a slide or slides, domestic waste water being arranged to be discharge into the channel.

The manure mixing chamber and the storage tank are preferably adapted at their lowest parts, by a pipe adapted to be closed by a slide valve, the said mixing chamber being provided with a stirring and cutting mechanism and with a suction pipe leading to a pump, the suction opening of the said pipe being adapted to be adjusted by various heights in the mixing chamber, the said pump being adapted by operation of suitable valving to deliver manure into a pipe for removal of the manure and sprinkling thereof over agricultural land. The manure mixing chamber is preferably of substantially conical shape at its lower part, tapering to a minimum diameter at its lowest point, and having the stirring and cutting mechanism arranged in the said lower part, whilst the storage tank is preferably provided with stirring blades.

When a short stall is used, it is to be expected that the animal will always stand on the grid. In order to avoid damage to the hooves, the grid is provided with elastic members as stated above so that when the animal steps on them, it always stands only on elastic smooth members and cannot be injured by any sharp edges of the grid.

In order to prevent blockage when the elastic members are deformed the deformable elastic members should have drainage apertures.

It is also advisable for the upper surface of the elastic members to have conventional grooves, humps and the like to prevent an

[*Price* 4*s.* 6*d.*]

animal slipping when the upwardly extending lugs are deflected.

When the elastic members are formed from synthetic materials it is advisable for the members to have metal mountings for attachment to the rigid bar portions of the grid. The members may be hinged to the bars of the grid.

The elastic members may have luminescent substances embedded therein or applied thereto.

The attachable elastic members may be of cruciform shape and the edges of the bars of the grid may have rounded bearing surfaces.

The grid must be suitably constructed and the spacing of the bars must be sufficient to allow quantities of solid and liquid manure to pass into the trough and it is also important that the trough should be closable by a hand-operated slide before it runs into the manure mixing pit.

This hand-operated slide is advisable so that the discharge can be very rapidly effected so that, due to the high flow speed, all substances in the trough are carried away.

It is particularly advisable for the drainage pipes of the domestic waste waters to empty into the flushing channel.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a perspective view of the entire installation consisting of a short stall, grid and manure treatment installation, the floor of the short stalls and the grid forming a continuous plane;

Fig. 2 is an enlarged underneath view of part of the grid shown in Fig. 1 and an elastic covering for part of the grid;

Fig. 3 is an inverted sectional view on the line I—I of Fig. 2;

Fig. 4 shows an alternative form of elastic member for the grid provided with a portion which extends beyond the upper surface of the grid; and

Fig. 5 shows the upwardly extending portions of Fig. 4 in a position in which they have been deflected.

In Fig. 1, the cow 1 is standing in a short stall 2 behind which a grid 3 is arranged. This grid 3 is formed from intersecting bars and covers the channel or trough 4. By way of the hand-operated slide 5, a dung-and-water mixture passes into the manure mixing pit 6 which is conical at its lower part, and from there, if desired, into the storage tank 7. Located in the mixing pit 6 is a stirring and cutting mechanism 8, while the storage tank 7 is provided with stirring blades 9. The waste-pipe 10 of the domestic waste water may also flow into the trough 4. The grid 3 comprises upper elastic members 11 supported on rigid bars 12 as shown in Figs. 4 and 5.

Figs. 4 and 5 show, in addition to the grid, one form of elastic members 11, Fig. 4 showing some of the members 11 in the vertical position and Fig. 5 showing some of the elastic members 11 in a turned-over position. The elastic members 11 can however only be turned over by loading, that is to say, by the hooves of the animals standing thereon, and they serve to prevent hooves of the animals becoming trapped between the bars 12.

As shown in Figurs 2 and 3 the crossing points of the rigid grid are covered by a number of cruciform members 24 and the grid is made suitable for cattle to stand or lie on permanently. The members 24 have surfaces 25 which rest on the top of the bars 12 of the grid 3 and attached to the surfaces 25 are flaps 26 which, as shown in Figure 3, engage on each side of the bars 12 of the grid member 3. The flaps 26 are locked together on the underside of the grid member by having the flaps 26 on one side of a bar 12 interlocking with the flaps 26 on the adjacent transverse bar 12 of the grid member. Elastic members 28 may be provided on some of the members 24. The elastic members 28, like the elastic members 11, serve to prevent the hooves of an animal becoming trapped between the bars 12 of the grid 3. The elastic members 11 also have holes and perforations, so that they may permit of a good flow through the grid.

The stirring and cutting mechanism 8 is driven by a motor 13 which also drives a pump. A pump 14, provided, which is adapted to suck through a suction pipe 15 the water-and-dung mixture out of the storage container 7 and to expel it through a pipe 16 leading to a sprinkling installation (not shown). However, by suitably adjusting a number of valves 17, 18, 19 the pump driven by the motor 13 can be arranged to suck out of the mixing pit 6 through a suction pipe 20 and pipe 23'. By adjustment of a slide 21, it is possible for the pump driven by the motor 13 to suck manure from the bottom of the storage container 7 through the pipe 22' and to deliver it to the mixing pit 6 in the direction of the arrow 22, whence it is conveyed once again through the pipe 23' in the direction of the arrow 23 back into the storage container 7. Thus the manure in the storage tank 6 and the mixing pit 7 can be comminuted in this manner.

A connector may be attached to the suction pipe 20 so that a line may be provided, for drawing off manure directly from the manure mixing pit 6 into liquid manure vats not shown). The object of the stirring blades 9 which are driven by the motor of the pump 14 is to prevent the formation of a covering layer of scum on the mixture within the container 7.

The mode of operation is as follows:—

The hand-operated slide 5 is closed, and the trough 4 is filled from the wastepipe 10, by opening a valve in the house, until the highest point of the trough, which is arranged at an incline is covered by the liquid. When the trough is sufficiently full, the hand-operated slide valve 5 is opened. The manure and water mixture then flows into the mixing pit 6 and is mixed there by the stirring and cutting mechanism 8. The motor 13 is operated to drive its pump to suck the mixture up through the pipe 20 and introduce it into the storage tank 7 through the pipe 15, in the direction of the arrow 23, the valve 18 being closed and the valves 17, 19 being opened. The slide 21 at this time is fully closed. Removal of the mixture from the storage container 7 is effected by opening the slide 21 and valves 17, 18 and closing the valve 19 and then operating the pump 14, the mixture being sucked through the pipe 22' and suction pipe 20. This manure and water mixture is forced into the pipe line 16 and conveyed to the sprinkler. By opening the slide 21 and the valves 17 and 19, the mixture can be circulated by the pump driven by the motor 13 in the direction of the arrows 22, 23 through the pipes 22', 20 and 23' and 15.

WHAT WE CLAIM IS:—

1. A manure disposal installation comprising a drainage channel communicating with a mixing chamber having cutting and stirring means and a storage tank connected to the mixing chamber, a first pipe being connected between the mixing chamber, storage tank and disposal means and including valve means whereby the chamber can be selectively connected to either the tank or the disposal means, and including a further pipe connected directly between said chamber and tank.

2. A manure disposal as claimed in Claim 1, in which the open portion of the channel is covered by a grid.

3. A manure disposal installation as claimed in Claim 2 in which the grid is provided with deformable elastic members carried on rigid members of the grid.

4. A manure disposal installation as claimed in Claim 2 or 3, in which some of the bars of the grid are covered by elastic members which are cross-shaped and fit over the bars forming the grid.

5. A manure disposal installation as claimed in Claims 3 or 4, in which the elastic members are provided with downwardly extending flaps and upwardly extending lugs, the flaps extending on either side of the rigid bar members and interlocking with adjacent flaps and gripping the said rigid bars, said upwardly extending lugs being adapted to yield resiliently when deflected by load and to resume their original shape and position as soon as any load applied to them is removed.

6. A manure disposal installation as claimed in any one of Claims 2 to 4 in which the upwardly extending lugs of the elastic members, when bent over by the application of weight thereto cover adjacent drainage apertures provided in the said elastic members and spring back into their original shape and position when such weight is removed therefrom.

7. A manure disposal installation as claimed in any of the preceding claims, in which the drainage channel is closable, at or near its discharge end, or additionally at intermediate points along its course, by means of a slide or slides, domestic waste water being arranged to be discharged into the drainage channel.

8. A manure disposal installation as claimed in any of the preceding claims, in which the manure mixing chamber and the storage tank are connected, at their lower parts, by the second pipe which is adapted to be closed by a slide valve, the said mixing chamber being provided with a motor driven stirring cutting mechanism and with a suction pipe leading to a pump, the suction opening of the said pipe being adapted to be adjusted to various heights in the mixing chamber, the said pump being adapted to deliver manure into a pipe for removal of the manure, and sprinkling thereof over agricultural land.

9. A manure disposal installations as claimed in Claim 8, in which the manure mixing chamber is of substantially conical shape at its lower part, tapering to minimum diameter at its lowest point, the stirring and cutting mechanism being arranged in its lower part, whilst the storage tank is provided with stirring blades.

10. A manure disposal installation as claimed in any of the preceding claims, in which the upper surface of the elastic upper portion of the grid is flush with the floor surface of the stall.

11. A manure disposal installation, constructed and arranged to operate substantially as herein described, with reference to and as illustrated in the accompanying drawings.

POTTS & CO.

Leamington Spa: Printed for Her Majesty's Stationery Office by the Courier Press.—1963.
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2, from which copies may be obtained.

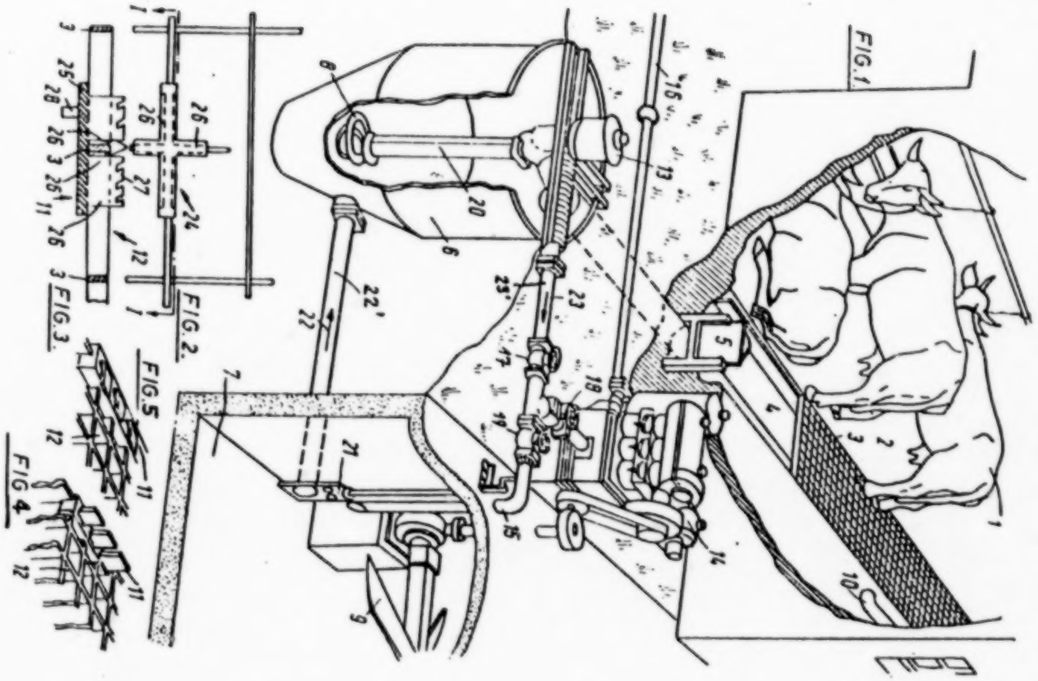


FIG. 1

FIG. 2.

FIG. 3.

FIG. 5

FIG 4

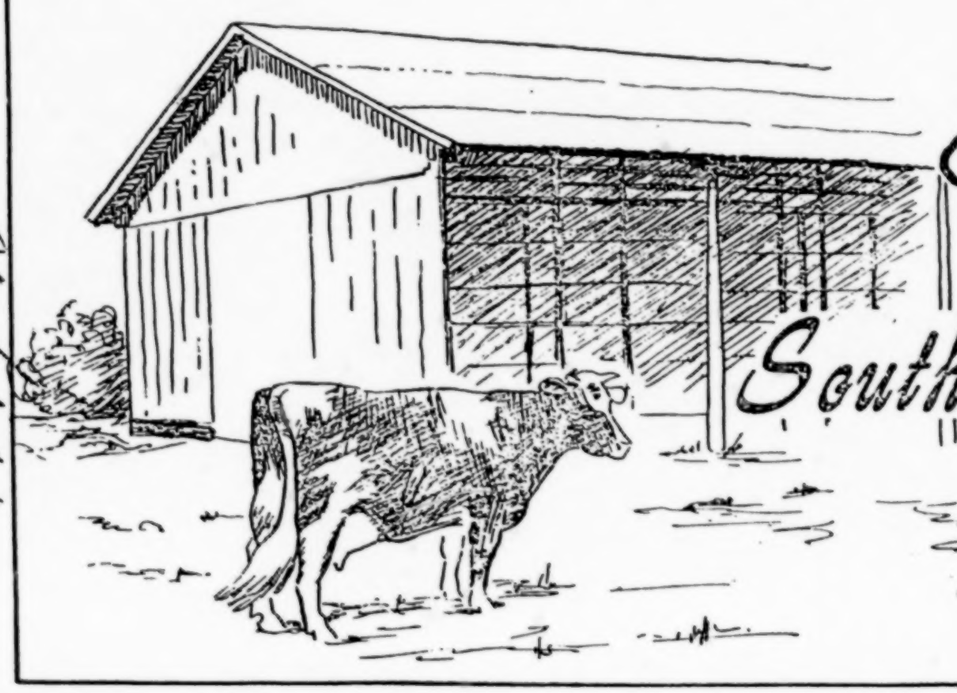
914649 COMPLETE SPECIFICATION
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

100.

EXTENSION AGRICULTURAL ENGINEERING HANDBOOK NO. 2

CATTLE SHELTERS & EQUIPMENT

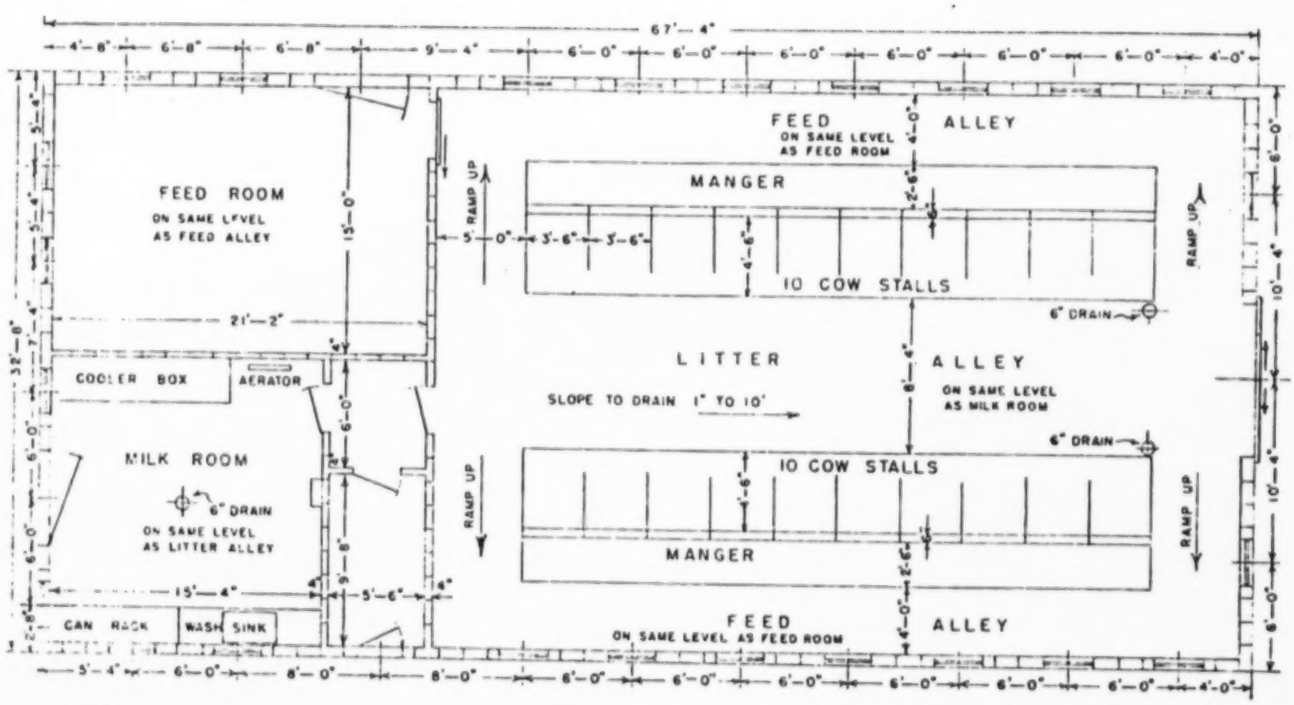
for



South Carolina

CLEMSON AGRICULTURAL COLLEGE COOPERATING WITH
UNITED STATES DEPARTMENT OF AGRICULTURE
EXTENSION SERVICE, GEO. B. NUTT, DIRECTOR
CLEMSON, SOUTH CAROLINA

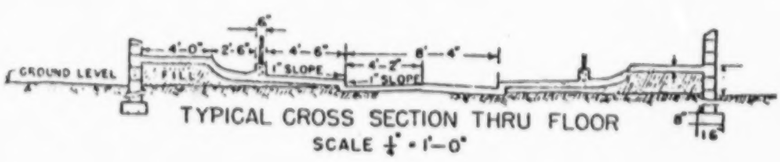
DEC. 1958



NOTE

IF HIGH BACK FEED MANGER AS ILLUSTRATED ON PAGE 32 IN CIRCULAR 307 IS USED, ENTIRE FLOOR AREA IS ON SAME PLANE

FLOOR PLAN
SCALE $\frac{1}{4}$" = 1'-0"

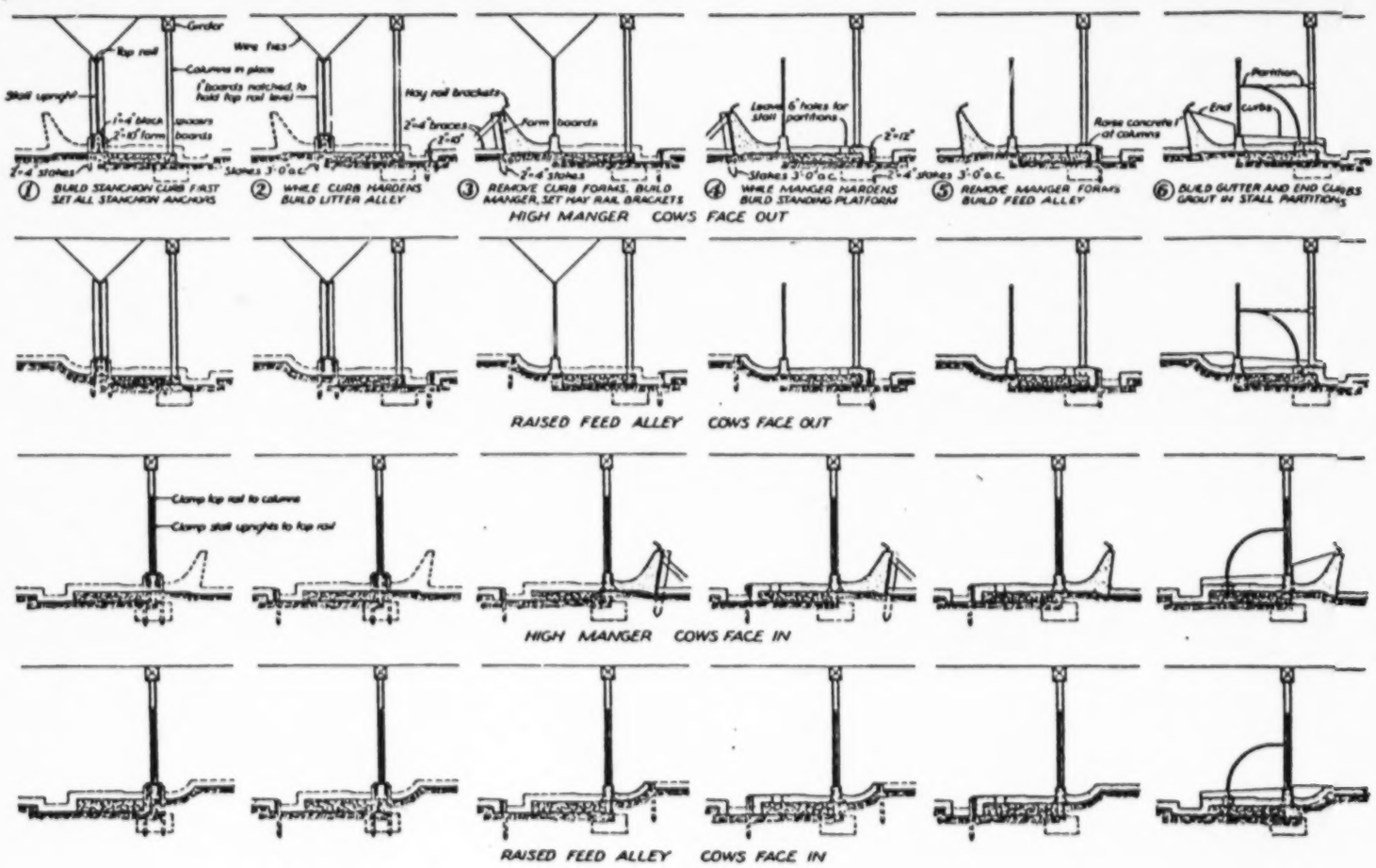


TYPICAL CROSS SECTION THRU FLOOR
SCALE $\frac{1}{4}$" = 1'-0"

WHOLESALE PRODUCER
20 COW DAIRY BARN
PLAN NO. 139

102.

21



103.

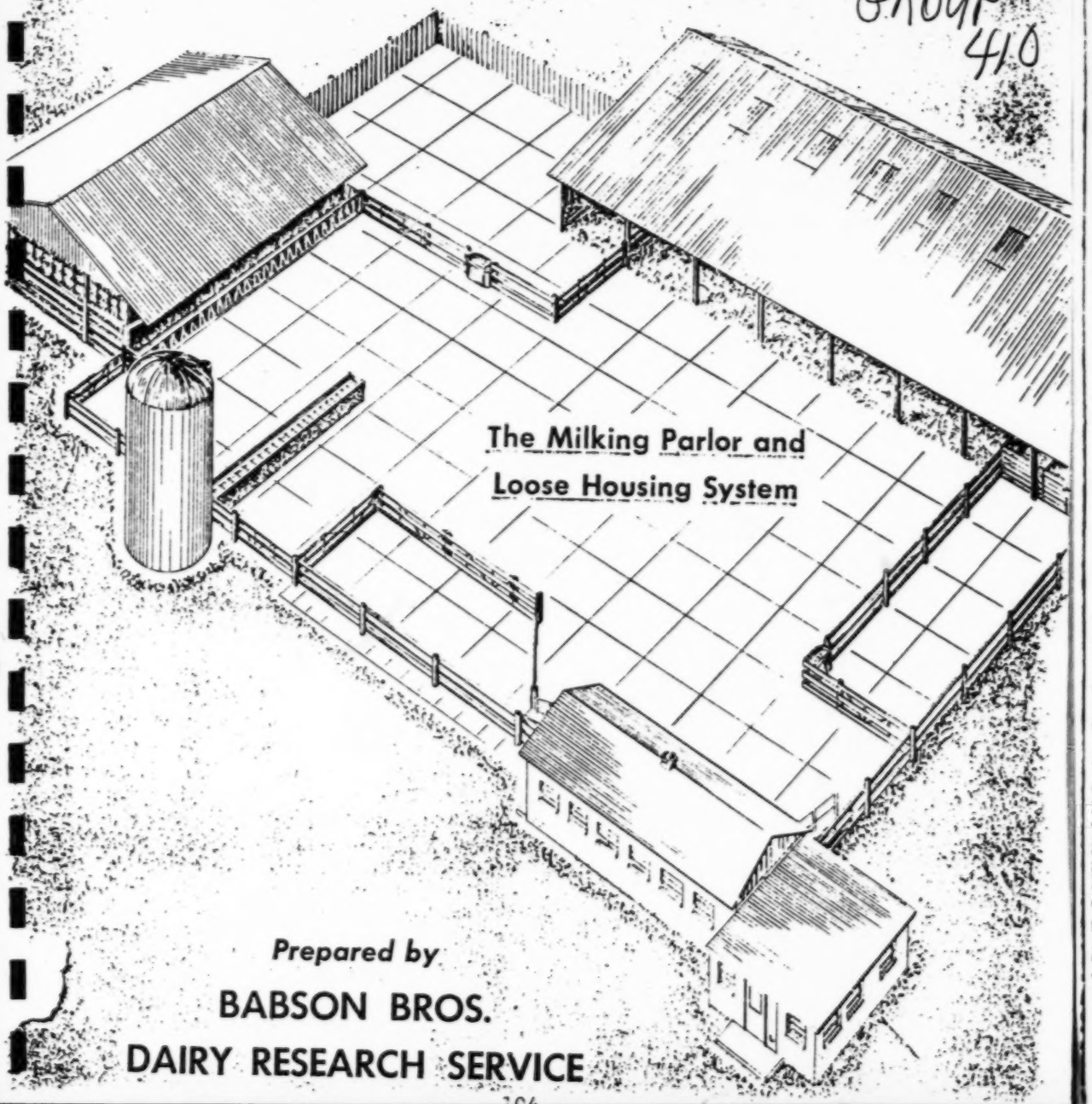
STEPS IN CONCRETING DAIRY-BARN FLOORS

Considerable difficulty will be avoided if the various parts of a dairy-barn floor are built in the order suggested by this plan. Drawing No. -5106 (1 sheet)

26

The Way Cows Will Be Milked On YOUR Farm "Tomorrow"

GROUP 410



The Milking Parlor and Loose Housing System

Prepared by

BABSON BROS.

DAIRY RESEARCH SERVICE

KEEP COWS CROWDED is function of good Holding Pens. Here is a wide lane which serves as a Holding Area for a large herd. As cows move through parlor, gate can be swung across lane to crowd remaining cows.

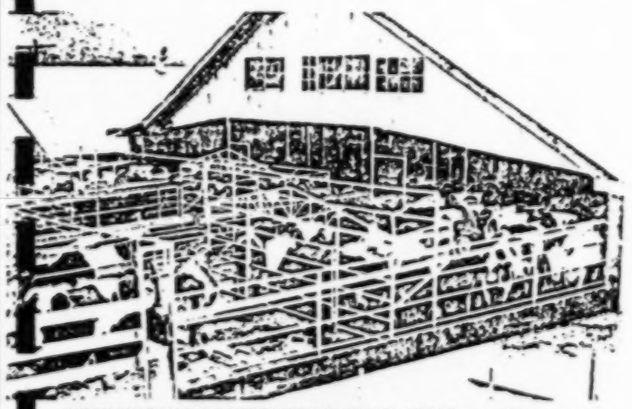
Your Holding Pen Makes a Difference in Milking Efficiency

A Holding Pen is more than just a fence to separate the unmilked cows from the milked ones!

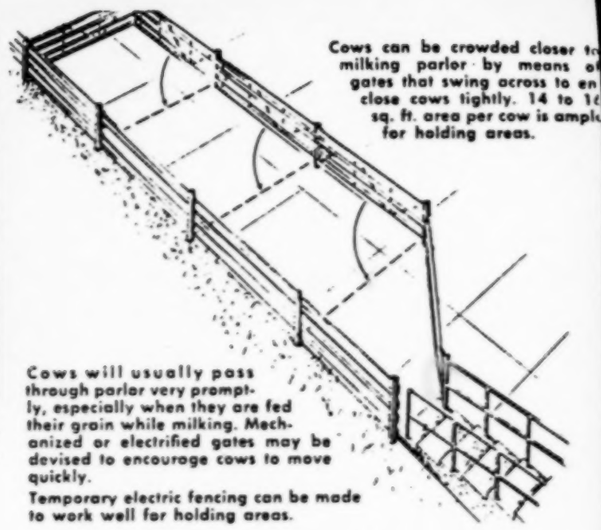
It is actually an integral part of a loose-housing system and should be planned to hold cows so that they can and will move automatically and swiftly into the milking parlor.

In the first place it should be "too small" for cow comfort . . . about 14 square feet per animal packs cows tightly enough so that they will WANT to get out . . . through the milking parlor. Some men use sectional gates to reduce holding area as cows leave it. Some have power operated fences which hold cows bunched up as others move out to be milked.

Also it should channel the cows toward the milking parlor door. A square pen is never as good as a long narrow one . . . or, a triangular pen which guides cows to parlor ramp or entrance door.



MECHANICALLY CONTROLLED HOLDING AREAS on a large commercial dairy handling up to 1000 cows. "Strings" of 60 to 80 animals are brought from corrals to pens shown. As cows move through parlor, gates on tracks keep cows bunched toward entrance ramps. In warmer climates, spray heads are sometimes set in concrete for washing away mud or dust during holding.



Cows can be crowded closer to milking parlor by means of gates that swing across to enclose cows tightly. 14 to 16 sq. ft. area per cow is ample for holding areas.

Cows will usually pass through parlor very promptly, especially when they are fed their grain while milking. Mechanized or electrified gates may be devised to encourage cows to move quickly.

Temporary electric fencing can be made to work well for holding areas.

For best results provide a pen that funnels the cows toward a ramp or steps with a holding lane long enough for 2 or 3 cows to line up . . . so that there will be no place to go but into the milking parlor.

Since the Holding Area will need regular cleaning, provide gates or movable fence so that power equipment may be used at the same times the paved lot is cleaned.

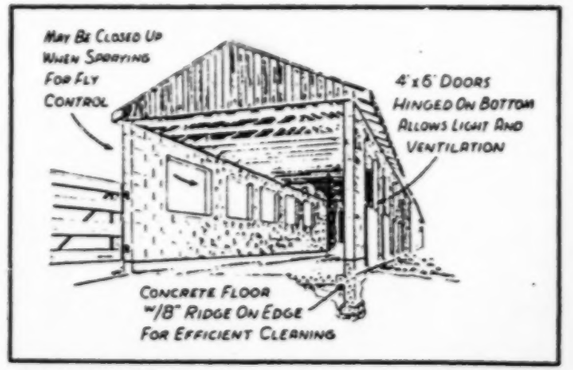
CLEANING

The Holding Area as well as the Paved Lot should be cleaned as needed to prevent any build-up of mud or manure.

By means of portable fences and a natural slope, such cleaning can be done with tractor and scraper blade.

Some dairymen provide a "dock" where droppings may be scraped into spreaders parked below dock level. Others load spreaders regularly . . . or, push waste and manure into a side area until spreading can be done conveniently.

Liquid manure as a fertilizer is popular in some areas. Special equipment and provision for handling it is necessary. Check with local college agricultural engineering departments.



COVERED HOLDING AREAS are desirable when cows need protection from freezing winds, snow or excessive rains for considerable periods of time. A well drained, unobstructed area for cleaning is necessary. Good ventilation and light is needed to help dry the area. Avoid holding cows on bedded areas or any area which cannot be cleaned regularly.

Editorial Note

AFTER BLACK ROCK: NEW TESTS OF PATENTABILITY—THE OLD TESTS OF INVENTION

Introduction

In *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*[1] the Supreme Court revived the illusory "invention" standard as a requisite of patent validity. In light of its apparent rejection by Congress and subsequent abandonment by the Court, the reappearance of this standard in *Black Rock* raises questions of vital concern to proponents of a functional patent system. The ample history of its application indicates that the "invention" requirement provided little guidance in determining patentability. Aptly termed "the plaything of the judges,"[2] it was never clearly defined nor consistently employed.[3]

1. 396 U.S. 57, 163 U.S.P.Q. 673 (1969)..
2. Judge Rich of the Court of Patent Appeals has stated:
   In the final analysis, all it amounted to was that if the court thought the invention, though new and useful, was not patentable, then it did not involve "invention" and vice versa. The requirement for "invention" was the plaything of the judges who, as they became initiated into its mysteries, delighted to devise and expound their own ideas of what it meant; some very lovely prose resulting.

Rich, *Principles of Patentability*, 28 GEO. WASH. L. REV. 393, 404 (1960).

3. Speaking of "invention," the Supreme Court has said:
   The truth is the word cannot be defined in such manner as to afford any substantial aid in determining whether a particular device involves an exercise of the inventive faculty or not. In a given case we may be able to say that there is present invention of a very high order. In another we can see that there is lacking that impalpable something which distinguishes invention from simple mechanical skill. Courts, adopting fixed principles as a guide, have by a process of ex-

The presence or absence of "invention," ostensibly a guide to measure the patentee's claim, served rather as a vehicle for rationalizing a conclusion derived from judicial consideration of a variety of factors—factors as numerous as the courts which examined them.

The inconsistency and uncertainty which attended the courts variegated approach prompted Congress to prescribe a statutory solution.[4] The Patent Act of 1952 established a precise standard expressed in terms of nonobviousness. The nonobviousness test, embodied in section 103 of the Act, compels a comparison between the subject matter of the patent and the previous state of the art to determine whether the patentee's contribution to the useful arts would have been obvious at the time of its formulation. The standard of reference for that determination is a person possessing "ordinary skill" in the pertinent art. Congress recognized the ambiguity of the term "invention" and specifically chose not to include it in section 103.[5]

The *Black Rock* decision represents a departure from the Court's adoption of the statutory requirement of nonobviousness as a sufficient gauge of patentability. Mr. Justice Douglas, writing for the full Court, clothed his opinion in the old language of "invention," thereby countenancing a more rigorous standard of patentability than that required by section 103 alone.

This note will explore the ramifications of the latest Supreme Court pronouncement as it affects the current test of nonobviousness. It is suggested that section 103 provides a reasonable standard which may be applied by the courts with the uniformity necessary to lend predictability to the patent system. To encumber the standard of nonobviousness with the vagueries of "invention," as *Black Rock* suggests, will produce confusion for the courts and uncertainty for those concerned with patent protection.

Before the Patent Act of 1952—The Requirement of Invention

The validity of a patent depends upon the presence of several conditions. "Novelty"[6] and "utility"[7] have been established as prerequisites of patentability since the Patent Act of 1793.[8] While these requirements originated with specific statutory provisions, the element of "invention" was judicially evolved. Despite congressional

   clusion determined that certain variations in old devices do or do not involve invention; but whether the variation relied upon in a particular case is anything more than ordinary mechanical skill is a question which cannot be answered by applying the test of any general definition.

McClain v. Ortmayer, 141 U.S. 419, 427 (1891).

4. The Patent Act of 1952, 35 U.S.C. § 103 (1964); *see* text accompanying note 90, *infra*.
5. *See* text accompanying notes 94-105, *infra*.
6. 35 U.S.C. § 102 (1964).
7. *Id.* § 101.
8. Patent Act of 1793, ch. 11, 1 Stat. 318.

silence, courts pointed to the enabling provision of the Constitution as the source of this third requirement of patentability. Article I, section eight authorizes Congress to issue patents in order to "promote the progress of science and the useful arts."[9] Examination of that expressed purpose of patent protection, coupled with use of the terms "inventors" to describe the patentees and "discoveries" to denote those creations which may be considered deserving of such protection, convinced the judiciary that a contribution must be characterized by something more than mere "novelty" and "utility" in order to be worthy of the exclusionary rights embodied in a patent.[10] That additional characteristic was denominated "invention."

The Supreme Court's initial verbalization of the standard of "invention" came in *Hotchkiss v. Greenwood*.[11] There, the patentee had claimed a method for facilitating the fastening of a door knob to its shank by making the knob out of clay. Affirming the judgment below, the Court stated that the door knob was unpatentable, "unless more ingenuity and skill in applying the old method of fastening the shank and the knob were required in the application of it to the clay or porcelain knob than were possessed by an ordinary mechanic acquainted with the business."[12] The *Hotchkiss* test fixed the skill level of the ordinary mechanic in the related business as the objective standard against which the presence of "invention" would be measured. In *Atlantic Works v. Brady*,[13] the Court reaffirmed its position by declaring that the patent laws were not meant ". . . to grant a monopoly for every trifling device, every shadow of a shade of an idea, which would naturally and spontaneously occur to any skilled mechanic or operator in the ordinary progress of manufactures."[14] A device would be denied patent protection if its formulation would have been apparent to a skilled

9. U.S. CONST. art. I, § 8 states that: "The Congress shall have power to promote the progress of science and useful arts, by securing for limited Times to . . . Inventors the exclusive right to their . . . Discoveries. . . ."
10. Thompson v. Boisselier, 114 U.S. 1 (1884); *see* Gardner v. Herz, 118 U.S. 180 (1886). *But see* Rich, *Patentability*, *supra* note 2, at 405: "The words 'Inventors' and 'Discoveries' no more dictate that an invention must be better than does the promotion of progress clause. The Constitution, therefore, contains no such requirement." In *Thompson* the Supreme Court extended this argument to find statutory justification for the "invention" requirement by referring to the language of the Patent Act of 1836, ch. 357, § 6, 5 Stat. 119, which required that the patentee be an individual who had "discovered or invented a new and useful art, machine, manufacture or composition of matter." The Patent Act of 1870, ch. 230, § 24, 16 Stat. 201, identified the patentee as the one who "invented or discovered." Although neither of the statutes contained any explicit mention of "invention," the Court considered the requirement implicit in the Congressional language. Thompson v. Boisselier, *supra* at 13.
11. 52 U.S. (11 How.) 248 (1850).
12. *Id.* at 267.
13. 107 U.S. 192 (1882).
14. *Id.* at 200.

mechanic in the ordinary performance of his work.[15] It was in light of the *Atlantic Works* opinion that the Court reiterated its conclusion—first expressed in *Hotchkiss*—that "invention" was a necessary prerequisite of patentability.[16] The Court's expression of the test of "invention" emerging from *Hotchkiss* and *Atlantic Works* resulted in an exclusionary rule whereby a patent would be denied any device whose development would have been obvious to a mechanic skilled in the pertinent art.

Nineteenth century courts were generally responsive to the guidelines set out in *Hotchkiss*. Technology, still in its infancy in most fields, was usually within the comprehension of the lay judge. He was able to examine the patentee's claim from the posture of one skilled in the relatively uncomplicated art of the times and thereby evaluate the validity of a patent within the framework of the *Hotchkiss* test.[17]

In *Vinton v. Hamilton*,[18] the patentee claimed a cupola-furnace and a cinder-notch in combinaton, both elements being old and the cinder-notch being used with a blast furnace. The Court determined that the cinder-notch performed the same function when used with the cupola-furnace as it had when used with the blast furnace and thus its application to a different type furnace "would occur to any practical man, and that [therefore] there was nothing patentable in such application."[19] *Hall v. MacNeale*[20] concerned a patent claiming a solid conical bolt with a screw-thread on it. Since both the solid conical bolt and the use of a screw-thread on a cored conical bolt were known to the prior art, the Court concluded: "There was no invention in adding [the one element to the other]."[21]

The problem of defining "invention" became more critical in the twentieth century. The *Hotchkiss* standard for "invention," conceived in the context of an elementary technology, became difficult to apply to the complexities of an industrial age.[22] As a result, the courts began to elaborate upon the concept of "invention."[23] The

15. The reader will note a similarity between this interpretation of the early *Atlantic Works* doctrine and the later nonobvious standard of section 103. Nonetheless the more common reference to a "trifling device" found in later decisions was restrictive and failed to address the question of nonobviousness. Although courts employed the "every trifling device" phrase to describe those devices which they felt lacked that "inventive" quality required for patentability, such application was no more than a statement of a legal conclusion. The opinion in *Atlantic Works* is more properly interpreted as a reaffirmation of the test set out in *Hotchkiss*. Although stated as a negative rule, it meant that a "trifling device" was that device which was obvious to the skilled mechanic or operator.
16. 114 U.S. 1 (1884).
17. *See generally* Dession, *The Trial of Economic and Technological Issues of Fact*, 58 YALE L.J. 1019, 1242 (1949) (pts. 1-2); Note, *Subtests of "Nonobviousness": A Nontechnical Approach to Patent Validity*, 112 U. PA. L. REV. 1169 (1964).
18. 104 U.S. 485 (1881).
19. *Id.* at 492.
20. 107 U.S. 90 (1882).
21. *Id.* at 96.
22. Note, "*Nonobviousness*", *supra* note 17, at 1169-70.
23. *Hearings on H.R. 3760 Before Subcomm. No. 3 of the House Judiciary Comm.*, 82d Cong., 1st Sess. 58-70 (1951).

element of "invention" was variously described as patentable novelty,[24] the exercise of the inventive faculty[25] or the creative faculty,[26] and inventive skill or inventive effort.[27] This variety of definitions prompted Judge Learned Hand to conclude: "You could find nearly anything you like if you went to the opinions. It was a subject on which judges loved to be rhetorical."[28]

It was in the nature of their elaboration that courts differed markedly. The proliferation of tests and standards utilized to determine the presence or absence of "invention" produced inconsistent and unpredictable results. While some courts developed tests responsive to the objective standard expressed in *Hotchkiss*, others obscured the "invention" requirement in a morass of subjective criteria.

Subjective Tests

In determining the presence or absence of "invention," many courts looked to their own subjective notions of patentability.[29] The tests thus formulated were often expressed in a negative manner by characterizing the absence of "invention."[30] The postulate that substitution of materials did not constitute "invention" was illustrative of these rules.[31] In addition, courts determined that reversal of parts,[32] change of proportion,[33] change of location, size, degree and

24. United Chromium, Inc. v. International Silver Co., 53 F.2d 390, 393, 11 U.S.P.Q. 108, 111 (D. Conn. 1931), *modified*, 60 F.2d 913, 15 U.S.P.Q. 51 (2d Cir.), *cert. denied*, 288 U.S. 600 (1932); *cf.* Howell Co. v. Royal Metal Mfg. Co., 93 F.2d 112, 36 U.S.P.Q. 45 (7th Cir. 1937).
25. Potts v. Creager, 155 U.S. 597, 608 (1895).
26. Turner v. Goldstein, 144 F.2d 338, 341, 69 U.S.P.Q. 53, 55 (10th Cir. 1946).
27. Ansonia Brass & Copper Co. v. Electrical Supply Co., 144 U.S. 11, 18 (1892); Smith v. Goodyear Dental Vulcanite Co., 93 U.S. 486, 497 (1876).
28. *Hearings on S. Res. 92 Before the Subcomm. on Patents, Trademarks and Copyrights of the Senate Comm. on the Judiciary*, 84th Cong., 1st Sess. 113 (1955). One witness who testified at the hearings held prior to passage of the Patent Act of 1952, described the mystery surrounding the word "invention" as an "enormous enveloping cocoon of metaphysical hocus-pocus." *Hearings on H.R. 3760, supra* note 23, at 58. Such comments reflect the confusing and conflicting principles which courts applied in rendering determinations of patent validity prior to the enactment of the Patent Act of 1952.
29. Although termed "subjective," the tests are better characterized as nonresponsive to the requirements of the *Hotchkiss* standard of "invention."
30. One comprehensive survey of rules of "invention" included a list of fourteen situations where "invention" was absent. Deller, *The Problem of Invention in the Law of Patents*, 28 J.P.O.S. 797, 802 (1946).
31. *See, e.g.*, Heath v. Frankel, 153 F.2d 369, 68 U.S.P.Q. 132 (9th Cir.), *cert. denied*, 328 U.S. 844 (1946); Evr-Klean Seat Pad Co. v. Firestone Tire and Rubber Co., 118 F.2d 600, 49 U.S.P.Q. 129 (8th Cir. 1941); Paine & Williams Co. v. Baldwin Rubber Co., 113 F.2d 840, 46 U.S.P.Q. 109 (6th Cir. 1940).
32. *See, e.g.*, Hamilton Beach Mfg. Co. v. P.A. Geier Co., 230 F. 430 (7th Cir. 1916).
33. Ronning Mach. Co. v. Caterpillar Tractor Co., 129 F.2d 70, 53 U.S.P.Q. 593 (7th Cir.), *cert. denied*, 317 U.S. 670 (1942); Murphy v. Coe, 99 F.2d 994, 39 U.S.P.Q. 94 (D.C. Cir. 1938).

form,[34] and aggregation of parts[35] were not "invention." Determinations based upon these and other subjective rules[36] failed to identify the skill level in the art, or reflect a comparison between the prior art and the subject matter of the particular patent—considerations essential to determining whether the *Hotchkiss* standard of "invention" had been met.

Paralleling the development of these subjective tests was the emergence of a generally restrictive judicial attitude toward patent validity.[37] Courts used the subjective tests as tools to formulate a stricter standard of patentability congruent with the desire to protect the public from patent misuse.[38] In an early First Circuit decision,[39] holding that insertion of a paper tube between the outer shell of a lamp socket and the current-carrying parts of the socket lacked "invention," the court concluded that: "Reasonable consideration of such rules rejects the idea of accepting every ingenious and beneficial mechanical device as involving invention or discovery within the meaning of the Constitution and the statutes."[40] In the court's view, considerations of public policy mandated a rigorous evaluation of a patent as a prerequisite to the determination of validity. The opinion, however, offered no indication of the characteristics necessary to comply with this test.

The Supreme Court gave its approval to this stricter standard of patentability in *Sinclair & Carroll Co. v. Interchemical Corp.*[41] Con-

34. *See, e.g.*, Schick Service, Inc. v. Jones, 173 F.2d 969, 81 U.S.P.Q. 60 (9th Cir.), *cert. denied*, 338 U.S. 819 (1949); Sales Affiliates, Inc. v. Nat'l Mineral Co., 172 F.2d 608, 80 U.S.P.Q. 389 (7th Cir.), *cert. denied*, 337 U.S. 940 (1946); McCurrach v. Cheney Bros., 152 F.2d 365, 67 U.S.P.Q. 254 (2d Cir. 1945).
35. *See, e.g.*, Lincoln Eng'r Co. v. Stewart-Warner Corp., 303 U.S. 545, 37 U.S.P.Q. 1 (1938).
36. *See* Deller, *The Problem of Invention*, note 30 *supra*.
37. A series of cases which emerged from the Court of Appeals for the District of Columbia Circuit in the 1940's was illustrative of a stricter attitude toward the patentee. In Special Equip. Co. v. Coe, 144 F.2d 497, 62 U.S.P.Q. 12 (D.C. Cir. 1944), *rev'd*, 324 U.S. 370 (1945), the court held that public policy required an applicant to have some expectation of exploiting the patent. In Monsanto Chem. Co. v. Coe, 145 F.2d 18, 62 U.S.P.Q. 37 (D.C. Cir. 1944), the court looked to the degree of control the applicant had in the industry to determine if a patent should be awarded. The court evidently reasoned that granting a patent to an applicant with monopolistic control over the industry to which the patent applied would "impede science and the useful arts." *Id.* at 23, 62 U.S.P.Q. at 42. Finally in Potts v. Coe, 145 F.2d 27, 62 U.S.P.Q. 331 (D.C. Cir 1944), the result of a step-by-step experimentation was held not to be "invention." This negative rule was formulated to impose a stricter standard on the corporate research and development facility, the court explicitly holding that an invention emerging from such a facility must meet a higher standard of patentability than a device conceived by an individual inventor. *Id.* at 28, 62 U.S.P.Q. at 333. These and similar decisions were reached by courts disposed to eliminate misuse of patents by means of expedient findings of lack of "invention."
38. The inherent judicial fear of monopoly may play a significant role in patent litigation. Judge Hand said: "I think a great deal of the odium that has surrounded the subject is because patents are monopolies." *Hearings on S. Res. 92, supra* note 28, at 114. It has been suggested that the harsh judicial attitude of the late thirties and forties may have derived from the Depression and the spirit of the New Deal reform, *e.g.* trust-busting. Gregg, *Tracing the Concept of "Patentable Invention,"* 13 VILL. L. REV. 98 (1967).
39. Marshall v. Wirt, 232 F. 606 (1st Cir. 1916).
40. *Id.* at 608.
41. 325 U.S. 327, 65 U.S.P.Q. 297 (1945).

cerned with developing a patent system which would serve society rather than aid the individual patentee, the Court chose to pursue this goal through its interpretation of the "invention" requirement.

> The primary purpose of our patent system is not reward of the individual but the advancement of the arts and sciences. Its inducement is directed to disclosure of advances in knowledge which will be beneficial to society; it is not a certificate of merit, but an incentive to disclosure.[42]

But again, there was no explication of the standards a patentee would have to achieve to obtain a patent which the courts would consider valid. This harsh attitude, which persisted throughout the thirties and forties,[43] was accurately summarized in Justice Jackson's objection to the "strong passion in this Court for striking them [patents] down so that the only patent that is valid is one which this Court has not been able to get its hands on."[44]

Objective Tests

While many courts chose the subjective approach, others sought respite from the confusion by formulating tests more responsive to the *Hotchkiss* standard. Recognizing the difficulties attendant judicial treatment of complex technological concepts,[45] they employed non-technical criteria[46] to provide evidence of the presence or absence of "invention."

> Among these will figure the length of time the art, though needing the invention, went without it: the number of those who sought to meet the need, and the period over which their efforts were spread: how many, if any, came upon it about the same time, whether before or after: and—perhaps most important of all—the extent to which it superseded what had gone before.[47]

Evaluation of the record, in light of these criteria, enabled the court in each case to render a more objective determination of patentability:[48] "We have repeatedly declared that in our judgment this

42. *Id.* at 330-31, 65 U.S.P.Q. at 299.
43. *See* Cuno Eng'r Corp. v. Automatic Devices Corp., 314 U.S. 84, 51 U.S.P.Q. 272 (1941); note 86 *infra*.
44. Jungerson v. Ostly & Barton Co., 335 U.S. 560, 572, 80 U.S.P.Q. 32, 36 (1949) (dissenting opinion).
45. *See, e.g.*, Safety Car Heating & Lighting Co. v. General Elec. Co., 155 F.2d 937, 939, 69 U.S.P.Q. 401, 402-03 (2d Cir. 1946).
46. *See* Note, "*Nonobviousness*," note 17 *supra*.
47. Safety Car Heating & Lighting Co. v. General Elec. Co., 155 F.2d 937, 939, 69 U.S.P.Q. 401, 403 (2d Cir. 1946).
48. *See, e.g.*, Kirsh Mfg. Co. v. Gould-Merseteau Co., 6 F.2d 793 (2d Cir. 1925); Van Heusen Prods., Inc. v. Earl & Wilson, 300 F. 922 (S.D.N.Y. 1924):
> The prospect of getting objective tests for invention is tempting, but it is a mirage. How is it possible to say *a priori* what combination of elements needs an original twist of the mind, and what is within the compass of the ordinary clod? Is it not clear that the

approach is more reliable than a priori conclusions drawn from vaporous, and almost inevitably self-dependent, general propositions."[49] Viewing the *Hotchkiss* standard as requiring comparison between the device and the prior art, these courts looked to the circumstances preceding, attending and succeeding its appearance to provide indirect evidence of nonobviousness:

> Courts, made up of laymen as they must be, are likely either to underrate, or to overrate, the difficulties in making new and profitable discoveries in fields with which they cannot be familiar, and, so far as it is available, they had best appraise the originality involved by the circumstances which preceded, attended and succeeded the appearance of the invention.[50]

Among the criteria considered was long felt need in the industry:[51]

> Long recognition of an existing problem in any art, and the advantages to accrue to an industry from its solution, coupled with repeated failures to find solution, has ever been considered as highly persuasive of invention when success is finally attained.[52]

Similarly, a history of prior efforts and failures by those in the industry was considered significant in determining the presence of "invention."[53]

Two additional criteria were recognized by the Supreme Court in *Goodyear Co. v. Ray-O-Vac Co.*[54] In considering whether encasing a battery in a leakproof metallic shell constituted "invention," Justice Roberts noted that over a period of half a century the use of flash light batteries had increased greatly and that during that time the manufacturers, knowing the defects in the batteries, had not devised a remedy. The Court felt the long delay in taking that step and the commercial success which greeted the innovation were entitled to weight in the determination of patentability.[55]

General public adoption, as evidenced by commercial success, attained wide acceptance as an indication of the presence of "inven-

quality of a man's inventiveness must be tested by reconstituting the situation as it was in the light of the preceding history of the art?
Id. at 929.
49. Safety Car Heating & Lighting Co. v. General Elec. Co., 155 F.2d 937, 939, 69 U.S.P.Q. 401, 403.
50. *Id.*
51. *See e.g.*, Goodyear Co. v. Ray-O-Vac Co., 321 U.S. 275, 60 U.S.P.Q. 386 (1944); *In re* Sukman, 351 F.2d 658, 147 U.S.P.Q. 280 (C.C.P.A. 1965); Schnell v. Allbright-Nell Co., 348 F.2d 444, 146 U.S.P.Q. 322 (7th Cir. 1965); Twentier's Honolulu Oil Corp. v. Shelby Poultry Co., 293 F.2d 127, 130 U.S.P.Q. 289 (4th Cir. 1961); Trabon Eng'r Corp. v. Dirkes, 136 F.2d 24, 58 U.S.P.Q. 97 (6th Cir. 1943); Seymour v. Ford Motor Co., 44 F.2d 306, 7 U.S.P.Q. 182 (6th Cir. 1930).
52. Cleveland Trust Co. v. Schriber-Schroth Co., 92 F.2d 330, 334, 35 U.S.P.Q. 475, 479 (6th Cir. 1937).
53. Trabon Eng'r Corp. v. Dirkes, 136 F.2d 24, 58 U.S.P.Q. 97 (6th Cir. 1943).
54. 321 U.S. 275, 60 U.S.P.Q. 326 (1944).
55. *Id.* at 279, 60 U.S.P.Q. at 388. The majority opinion should be read in contrast with Justice Black's dissent which conformed to the stricter standard of patentability required by the Court in other cases. To Justice Black the real discovery was "that liquids would not leak through leak-proof solids," and that discovery, he maintained, "predated the dawn of written history." *Id.* at 280, 60 U.S.P.Q. at 388.

tion."[56] As a measure of public acceptance, commercial success evidenced nonobviousness since it was achieved by satisfying a previously unfulfilled need.[57] Moreover, while general acceptance was accorded weight, the Sixth Circuit recognized, "that where success follows acceptance by experts rather than by those unskilled, it is of far greater tribute to the ingenuity of the inventor."[58]

Occasionally the courts considered the action of competitors as evidence of nonobviousness.[59] They found "invention" indicated by a competitor's continuing infringement in the face of litigation and unsuccessful attempts to avoid the patent by minor modifications.[60] Considered also was substantial duplication of a patentee's device or process by an alleged infringer who was unable to circumvent it.[61]

The action of an alleged infringer after termination of a license under the patent and the existence of licenses based on substantial consideration were each considered indicative of "invention." If the former licensee continued to make, use or sell after termination of the license, the case for patent validity was thereby strengthened.[62] Commercial acquiescence by competitors in the form of acceptance of licensing agreements was also considered evidence of invention.[63]

56. Paramount Publix Corp. v. American Tri-Ergon Corp., 294 U.S. 464, 24 U.S.P.Q. 303 (1935); Smith v. Snow, 294 U.S. 1, 24 U.S.P.Q. 26 (1935); Tempco v. Apco, 275 U.S. 319 (1928); Eibel Process Co. v. Minnesota & Ontario Paper Co., 261 U.S. 45 (1923); Minerals Separation, Ltd. v. Hyde, 242 U.S. 261 (1916); Hollister v. Benedict Mfg. Co., 113 U.S. 59 (1885); Trabon Eng'r Corp. v. Dirkes, 136 F.2d 24, 58 U.S.P.Q. 97 (6th Cir. 1943); Cleveland Trust Co. v. Schriber-Schroth Co., 92 F.2d 330, 35 U.S.P.Q. 475 (6th Cir. 1937); National Battery Co. v. Richardson Co., 63 F.2d 289, 17 U.S.P.Q. 60 (6th Cir. 1933); Naivette v. Bishinger, 61 F.2d 433, 15 U.S.P.Q. 200 (6th Cir. 1932). A problem would arise, however, when there were alternative explanations for the commercial adoption, e.g., a successful marketing campaign to promote the product. In such cases its weight as an indicator of "invention" would be greatly reduced.

57. In addition, in the typical situation commercial success was easy to measure by an analysis of increased sales and demand for the product or process patented.

58. Cleveland Trust Co. v. Schriber-Schroth Co., 92 F.2d 330, 335, 35 U.S.P.Q. 475, 480 (6th Cir. 1937).

59. *See* Williams Mfg. Co. v. United Show Mach. Corp., 121 F.2d 273, 50 U.S.P.Q. 264 (6th Cir. 1941); Consolidated Rubber Tire Co. v. Diamond Rubber Co., 162 F. 892 (2d Cir. 1908).

60. *See* Williams Mfg. Co. v. United Show Mach. Corp., 121 F.2d 273, 50 U.S.P.Q. 264 (6th Cir. 1941).

61. *See* Blake v. Robertson, 94 U.S. 728 (1876); Gen. Tire & Rubber Co. v. Fisk Rubber Corp., 104 F.2d 740, 41 U.S.P.Q. 346 (6th Cir. 1939); Gen. Elec. Co. v. Wagner Elec. Mfg. Co., 130 F. 772 (2d Cir. 1904).

62. *See* Stevens v. Schmid, Inc., 73 F.2d 54, 23 U.S.P.Q. 117 (2d Cir. 1934); Detroit Motor Appliance Co. v. Taylor, 66 F.2d 319, 18 U.S.P.Q. 226 (7th Cir. 1933); Adam v. Folger, 120 F. 260 (7th Cir. 1903).

63. Judge Hand described the "trade-off" which the licensee faces:

> [A]cquiescence has often been taken as evidence of invention upon preliminary injunction, but the force of the inference is variable. The reasoning is that if licensees consent to pay tribute, they must believe the disclosure to be patentable, and that this is evidence that it was beyond commonplace contrivance. But when a manufacturer takes a license, it is the resultant of two opposed motives, its cost and the dangers of infringement; and the magnitude of neither factor can be ascertained without knowing that of the other.

Ruben Condenser Co. v. Copeland Refrigeration Corp., 85 F.2d 537, 541, 31 U.S.P.Q. 6, 10 (2d Cir. 1936). *See* Eibel Process Co. v. Minnesota & Ontario Paper Co., 261 U.S. 45 (1923).

64. 303 U.S. 545, 37 U.S.P.Q. 1 (1938).

65. *Id.* at 549, 37 U.S.P.Q. at 3.

66. *Id.* The rationale of the Court's opinion is not clear from the expressed objection, i.e., that patentee claimed more than he invented. By claiming a patentable element in combination with other elements, a patentee actually dilutes his rights since only a device which comprises all of the claimed elements will directly infringe. It is suggested that the Court was disposed to render a decision adverse to the patentee because it considered judgment against the particular defendant in *Lincoln* inequitable. The action was brought against a manufacturer of fittings on the ground that the fittings were unusable and intended to be used in connection with the other elements of the claimed invention. The accused fitting was an "old" element and it would appear that the Court was opposed to construing the patentee's protection to include unpatented and unpatentable commodities. *See* Note, *Vending an Old Combination: A Patent Misuse - Antitrust Problem*, 57 GEO. L.J. 1057, 1060 (1969) wherein the *Lincoln* doctrine is considered in the context

These were some of the criteria adopted by those courts which sought objective guides for their evaluations of patentability. The relative weight given a particular factor varied with the facts of each case. But in each instance they provided evidence manageable by a lay judge, enabling him to arrive at a more objective determination of patent validity.

Patents for Mechanical Combinations—An Illustration

In later opinions, the Supreme Court assumed a general posture which evidenced a more negative and subjective attitude. The analysis which the Court applied in cases treating mechanical combinations illustrates the confusion attendant its vagrant approach. These cases dealt with devices claimed as combinations of mechanical elements. In some instances each of the elements was known in the prior art; in others, an element of the combination was itself new; but in all cases, patentability was claimed for the combination rather than any individual mechanical element. Couched in terms of the *Hotchkiss* standard, the patentee's assertion was that one skilled in the relevant art would not find it obvious to combine these elements to produce the claimed device.

In *Lincoln Engineering Co. v. Stewart-Warner Corp.*,[64] the patent in question dealt with an apparatus for lubricating bearings of the type used in automobiles. The means of lubrication known in the art consisted of a pressure pump for propelling the lubricant, a hose for conveying it, a fitting to join the lubricating apparatus to the bearing to be so treated and a coupling element to unite the fitting to the hose. The claimed combination differed from prior art in the coupling member, and the Court conceded the patentability of the coupler, at least *arguendo*.[65] Rather than claiming that element broadly, the patentee claimed it in combination with the other parts, i.e., pump, hose, and fitting. The Court declared the "patent . . . void as claiming more than the applicant invented."[66]

The test perceived as the appropriate gauge of patentability in combination cases was: where old elements are joined, the combination must perform some new function. In keeping with the prevailing attitude, the Court chose to enunciate its rule in terms of what did not constitute "invention": "The mere aggregation of a number of old parts or elements which, in the aggregation, perform or produce no new or different function or operation than theretofore performed or produced by them, is not patentable invention."[67] The patentee was not benefited by the presence of a patentable element within the combination. The entire combination had to satisfy the rule: "[T]he improvement of one part of an old combination gives no right to claim that improvement in combination with other old parts which perform no new function in the combination."[68] It is difficult to reconcile this position with the *Hotchkiss* guideline since one possessing the average skill of the calling would not be able to combine elements to create a device where one or more of those elements was unknown to him.

In a later case, the Court affirmed the combination rule stated in *Lincoln*. The subject matter in *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*[69] was a check-out stand, as used in a grocery store. The device combined a counter with a slidable three-sided open-bottom frame so that groceries could be deposited at one end and pulled over by the cashier when he was ready to tally the shopper's bill and package the purchased goods. Although each of the claimed elements was known, the district court held the patent valid.[70] The Court of Appeals, impressed with evidence of wide adoption of the stand, substantial commercial success, increased rate of consumer check-out, decreased costs for merchants and apparent fulfillment of a need in the industry, affirmed the judgment of the trial court.[71] The Supreme Court, however, reversed, on the strength of its finding that the elements performed no new functions when in combination. The three-sided frame, combined with

of extension of a monopoly.

Rather than treating the issue as one of infringement, the Court dealt with validity and arrived at the desired result — dismissal of the action — by declaring the patent invalid. Not only was the holding unnecessary, but the reasoning was incongruous in that the Court relied heavily on a prior case, Rogers v. Alemite Corp., 298 U.S. 415, 29 U.S.P.Q. 311 (1935), which dealt with a strikingly similar fact situation by holding that the patent was not infringed rather than declaring it invalid. Indeed, the Court, in that case, expressly stated that the claims were valid. *Id.* at 420, 29 U.S.P.Q. at 313.

67. 303 U.S. at 549, 37 U.S.P.Q. at 3.
68. *Id.* at 549-50, 37 U.S.P.Q. at 3.
69. 340 U.S. 147, 87 U.S.P.Q. 303 (1950).
70. Bradley v. Great Atl. & Pac. Tea Co., 78 F. Supp. 388, 77 U.S.P.Q. 343 (E.D. Mich. 1948).
71. 179 F.2d 635, 84 U.S.P.Q. 209 (6th Cir. 1950).

the counter, functioned as it would with any other table, and the counter supported groceries as it would without the frame.

Although in *A & P* the combination consisted of only old elements and was therefore distinguishable from the device in *Lincoln*, the prior decision was regarded as having accurately distilled the law on combinations.[72] The Court simply rephrased its test: "The conjunction or concert of known elements must contribute something; only when the whole in some way exceeds the sum of its parts is the accumulation of old devices patentable."[73]

This rule is insensitive to the lack of obviousness in bringing the several old elements together. A test which looks solely to the operation of the elements *after* they are combined must necessarily be premised on the unsound assumption that it is always obvious to take known things and combine them. It is the very unification of the elements, where the prior art fails to suggest such an action, that represents the advancement;[74] and the test of patentability should be directed to this factor.

The Court disposed of the patentee's evidence of long-felt need and commercial success by declaring these matters irrelevant to the determination of "invention."[75] The rejection of this evidence as bearing upon the question of patentability can only be attributed to the wide subjective discretion available to a court which employs a standard as cryptic as "invention."

The *Lincoln-A & P* test and the concomitant rejection of evidence such as commercial success and long-felt need, aided disposition of cases in accordance with the mandate expressed in *A & P* —that courts "scrutinize combination patent claims with a care proportioned to the difficulty and improbability of finding invention in an assembly of old elements."[76] Though on the facts these rules would appear limited in their applicability to the combination of mechanical elements, there is no justification for making a legal distinction based on the nature of the invention. As Judge Hand observed: "Substantially all inventions are the combination of old elements . . . ."[77] Recognizing that "element" has a

72. 340 U.S. at 151, 87 U.S.P.Q. at 305.
73. *Id.* at 152, 87 U.S.P.Q. at 305.
74. Safety Car Heating & Lighting Co. v. General Elec. Co., 155 F.2d 937, 69 U.S.P.Q. 401 (2d Cir. 1946): "Substantially all inventions are for the combination of old elements; what counts is the selection, out of all their possible permutations, of that new combination which will be serviceable." *Id.* at 939, 69 U.S.P.Q. at 402.
75. "The Court of Appeals and the respondent both lean heavily on evidence that this device filled a long-felt want and has enjoyed commercial success. But commercial success without invention will not make patentability." 340 U.S. at 153, 87 U.S.P.Q. at 306.
76. *Id.* at 152, 87 U.S.P.Q. at 306.
77. Safety Car Heating & Lighting Co. v. General Elec. Co., 155 F.2d 937, 939, 69 U.S.P.Q. 401, 402 (2d Cir. 1946). *See* Reiner v. I. Leon Co., 285 F.2d 501, 128 U.S.P.Q. 25 (2d Cir. 1960), *cert. denied*, 366 U.S. 929 (1961): "It is idle to say that combinations of old elements cannot be inventions; substantially every invention is for such a 'combination'; that is to say, it consists of former elements in a new assemblage." *Id.* at 503, 128 U.S.P.Q. at 27; Ruben Condenser Co. v. Copeland Refrigeration Corp., 85 F.2d 537,

broader definition than "a mechanical part," and that "combination" connotes any "relationship" between known entities,[78] one can see that a sequence of old or known steps, a reaction between known chemicals, or a product having a combination of known properties are combinations of old elements no less than a lubricating device or check-out counter. The rules and judicial attitude towards "invention," expressed in the mechanical combination cases, could consequently be applied to the whole spectrum of patent cases.

The Patent Act of 1952

Legislative Intent

While *A & P* was being considered by the Supreme Court, the patent bar was aiding Congress in the preparation of comprehensive patent legislation. Among the provisions contemplated was the addition of a third statutory prerequisite to patentability.[79] With the decision in *A & P*, the drafters became convinced that "invention" could not be considered an adequate standard.[80] Language was sought which would be capable of consistent and predictable application while providing a reasonable basis for determining patentability. The artificial rules established to delineate that which was not "invention" were rejected as was the "new function" test of *Lincoln* and *A & P*. From the host of available expressions and tests, nonobviousness to one of ordinary skill in the art was chosen as the standard.

In adopting this frame of reference, the drafters revealed a preference for the earliest definitions of the third prerequisite of patentability, especially that set forth in *Hotchkiss v. Greenwood*.[81] While most cases deviated from the original judicial norm, some courts had adhered to it. The opinions of Judge Hand, speaking for the Second Circuit Court of Appeals, reflected sensitivity to the so-called "objective" evidence as tending to show what would or would not be within the skill of the calling.[82] This approach had

31 U.S.P.Q. 6 (2d Cir. 1936), *cert. denied*, 300 U.S. 665 (1937): "[I]t is always the combination which counts, and no patents, or almost none, are made from new elements." *Id.* at 541, 31 U.S.P.Q. at 10.

78. *See* Bailey, *A Proposal for: A Standard of Patentability; Consonant Statutory Changes: A Manual on Determination of Patentability*, 41 J.P.O.S. 192, 212-215 (1961).

79. The other requirements are utility, 35 U.S.C. § 101 (1964), and novelty, 35 U.S.C. § 102 (1964).

80. *See* Rich, *Congressional Intent—Or, Who Wrote the Patent Act of 1952* in PATENT PROCUREMENT AND EXPLOITATION 61, 70 (1963).

81. 52 U.S. (11 How.) 248 (1850).

82. *See* Safety Car Heating & Lighting Co. v. General Elec. Co., 115 F.2d 937, 69 U.S.P.Q. 401 (2d Cir. 1946); Ruben Condenser Co. v. Copeland Refrigeration Corp., 85 F.2d 537, 31 U.S.P.Q. 6 (2d Cir. 1936).

been adopted by other courts.[83] Despite increasing strictness on the part of the Supreme Court,[84] the Court of Customs and Patent Appeals continued to apply the test it deemed appropriate. *In re Shortell*[85] expressed that court's determination to "continue to hold that if a process or thing constitutes patentable subject matter, is new and useful, and the process performed or thing produced would not be obvious to one skilled in the art, invention should be presumed and a patent may properly issue therefrom."[86] Congress vindicated this approach by embodying the nonobviousness standard in the Patent Act of 1952. Section 103 of that Act provided:

> A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.[87]

The congressional intent in enacting the statutory standard was to afford uniformity in the determination of patentability, and the application of that criterion was expected to have a "stabilizing effect."[88] The legislators viewed the test of nonobviousness as a reasonable basis for distinguishing those inventions worthy of patent protection and considered it capable of consistent and predictable interpretation.

83. *See* text accompanying notes 45-63, *supra*.

84. *See* text accompanying notes 37-44, *supra*; Picard v. United Aircraft Corp., 128 F.2d 632, 53 U.S.P.Q. 563 (2d Cir. 1942):

> We cannot, moreover, ignore the fact that the Supreme Court, whose word is final, has for a decade or more shown an increasing disposition to raise the standard of originality necessary for a patent. In this we recognize "a pronounced new doctrinal trend" which it is our duty, cautiously to be sure, to follow, not to resist.

Id. at 636, 53 U.S.P.Q. at 567.

Observers subsequently acknowledged the harsher standards of the Supreme Court. Judge Hand, in a 1955 decision, referred to the requirements of the preceding thirty years as being higher than those established in *Hotchkiss*, with Cuno Corp. v. Automatic Devices Corp., 314 U.S. 84, 51 U.S.P.Q. 272 (1941) representing "probably . . . the furthest departure" therefrom. Lyon v. Bausch & Lomb Optical Co., 224 F.2d 530, 536, 106 U.S.P.Q. 1, 6 (2d Cir. 1955). Hand alluded to this in hearings before the Senate in 1955 when he stated that "[i]t was pretty well accepted, I think, that perhaps 20 or 30 years ago, the Supreme Court had adopted a very much stiffer rule about what was invention." *Hearing on S. Res. 92, supra* note 28, at 119.

Statistical data indicated that the circuits regarded the Supreme Court as taking a stricter view toward patents and followed the high court's lead. In the same 1955 Hearings, P.J. Federico presented a report which included the following data: "U.S. Circuit Court of Appeals decisions: Percent held invalid: 1925-29 (33.4%); 1930-34 (38.0%); 1935-39 (50.9%); 1940-44 (60.5%); 1945-49 (64.5%); 1950-54 (60.7%)." *Id.* at 182-83.

Later cases reflected a recognition of the increased strictness demanded by the Supreme Court. *See* R.M. Palmer Co. v. Luden's, Ind., 236 F.2d 496, 499, 111 U.S.P.Q. 1, 4 (3d Cir. 1955), *cert. denied*, 352 U.S. 824 (1956); Ellis, Inc. v. Denis, 224 F.2d 311, 312, 106 U.S.P.Q. 125, 126 (1st Cir. 1955); Trico Prods. Corp. v. Delman Corp., 180 F.2d 529, 533, 84 U.S.P.Q. 416, 420 (8th Cir. 1950); *cf.* Kwikset Locks, Inc. v. Hillgren, 210 F.2d 483, 100 U.S.P.Q. 289 (9th Cir. 1954).

85. 142 F.2d 292, 61 U.S.P.Q. 362 (C.C.P.A. 1944).

86. *Id.* at 296, 61 U.S.P.Q. at 367. The court further stated: "In our opinion it is not within the province of the courts to establish new standards by which invention is to be determined. . . . [That] would be judicial legislation and not judicial interpretation." *Id.*

87. 35 U.S.C. § 103 (1964).

88. S. REP. No. 1979, 82d Cong., 2d Sess. 6 (1952).

It has been argued that Congress intended section 103 merely to codify the law of "invention" espoused by the Supreme Court at the time of its passage.[89] The legislation itself, as well as the events surrounding its enactment, adequately refute this thesis. Section 103 cannot be considered a reaffirmation of the tests employed by the Supreme Court, since it was the application of these very tests, culminating in the decision in *A & P*, which convinced the drafters that the "invention" standard had to be discarded, thereby precipitating the remedial action embodied in that provision.[90] Furthermore, the Senate committee report referred to section 103 as one of the major "innovations"[91] in a statute generally designed "to revise and codify the laws relating to patents."[92]

To insure that nonobviousness would displace "invention" as the norm, the Act retained the term "invention," but assigned to it a meaning wholly inconsistent with the previous usage of the phrase. "Invention" was defined as the thing discovered or created[93] and sections 101-03 set forth the conditions for ascertaining whether a particular invention was patentable.[94] Thus, every issued patent was to be regarded as disclosing an invention, limiting judicial inquiry to determination of the patentability of that invention. Judge Rich, an author of the legislation[95] and a persistent critic of the application of the

89. *See* notes 103-14 *infra* and accompanying text.
90. *See* Rich, *Congressional Intent*, *supra* note 80.
91. S. REP. No. 1979, *supra* note 88, at 4.
92. *Id.* at 1.
93. 35 U.S.C. § 100 (1964).
94. Section 101, which specified the categories of subject matter considered to be within the purview of patent protection, was entitled "Inventions Patentable." 35 U.S.C. § 101 (1964). That usage distinguished "invention" from a requirement of patentability.
95. Congressional comment on the Act was rather scant. *See* Note, *The Standard of Patentability—Judicial Interpretation of Section 103 of the Patent Act*, 63 COLUM. L. REV. 306 (1963); Note, *Section 103 of the Patent Act and the Standards of Invention: Comments on Lyon v. Bausch & Lomb Optical Company*, 44 GEO. L.J. 100 (1955); Note, *Patent Law—Test of Invention*, 1956 WISC. L. REV. 513. It affords less insight into the legislative intent than do the views of the actual drafters of the legislation. These were not Congressmen, but rather patent practitioners. *See* Rich, *Congressional Intent*, *supra* note 80, at 73. Of these, Messrs. Federico, Rich, and Harris were the most prominent and qualified to relate the purpose of the statute. Indeed, in an address to the Patent, Trademark and Copyright Section of the American Bar Association, Mr. Crumpacker, a former Congressman and member of Subcommittee No. 3 of the House Committee on the Judiciary when hearings were held on H.R. 3760 (which matured into the Patent Act of 1952), advised that:

> When the courts, in seeking to interpret the language of the Act, go through the ritual of seeking to ascertain the "intent of Congress" in adopting same, they would do well to look to the writing of these men—Federico, Rich, Harris, and the others—as they, far more than any member of the House or Senate, knew and understood what was intended by the language used.

Crumpacker, *The Patent Act of 1952—A Congressional Perspective*, in SUMMARY OF PROCEEDINGS, A.B.A.—SECTION ON PATENTS, TRADEMARKS AND COPYRIGHT LAW 141, 143 (1962).

"invention" standard to determinations of patentability, stated emphatically that section 103 was included in the bill "in order to get rid of the vague requirement of 'invention.'"[96] As he observed: "Nowhere in the entire act is there any reference to a *requirement* of 'invention' and the drafters did this deliberately in an effort to free the law and lawyers from bondage to that old and meaningless term . . ."[97]

In one sense, it is accurate to label section 103 a "codification" of prior case law. The law which the provision codified, however, was that first announced in *Hotchkiss v. Greenwood* and later applied by some courts despite deviation by the Supreme Court. To view section 103 as reinforcing the High Court's subjective standards of patentability is to ignore the record and disregard the very purpose of its enactment.

Further examination of legislative intent indicates that the "nonobviousness" standard was considered productive of a more favorable climate for patent validity.[98] Judicial rulings under the aegis of "invention" increasingly tended to be adverse to the patentee.[99] As P.J. Federico, another author of the Act, noted:

> While it is not believed that Congress intended any radical change in the level of invention or patentable novelty, nevertheless, it is believed that some modification was intended in the direction of moderating the extreme degrees of strictness exhibited by a number of judicial opinions over the past dozen or more years; that is, that some change of attitude more favorable to patents was hoped for.[100]

Federico supported this conclusion by reference to the language of section 103: "[A] variety of expressions used in decisions were available . . . but the language selected was of the more moderate variety."[101] Moreover, the House committee report revealed that section 103 was intended to "'minimize great departures which have appeared in some cases.'"[102] As Federico correctly observed: "[T]he departures of which complaint has been made in the recent past are all departures in the direction of greater strictness and hence these would be what the report indicates should be minimized."[103]

96. Rich, *Congressional Intent*, *supra* note 80, at 70.
97. Rich, *Patentability*, *supra* note 2, at 495 (emphasis added). He further advised: "[T]he requirement of invention should be referred to, if at all, only with respect due to that which is dead." *Id.*
98. L. James Harris, another of the drafters, said:

> If a random sampling of the items included in the revision is taken, some rather convincing evidence can be adduced of Congressional intent to moderate the strict interpretation of the courts and to encourage the courts to take a more friendly attitude toward patents, a practice from which they had departed in certain cases.

Harris, *Some Aspects of the Underlying Legislative Intent of the Patent Act of 1952*, 23 GEO. WASH. L. REV. 658, 679 (1954). *See also* Chin, *The Statutory Standard of Invention: Section 103 of the 1952 Patent Act*, 3 PAT., T.M. & COPR. FOUND. J. 317 (1959).
99. *See* notes 37-44 & 84 *supra* and accompanying text.
100. Federico, *Commentary on the New Patent Act*, 35 U.S.C.A. 1, 22-23 (1954).
101. *Id.* at 23.
102. H.R. REP. No. 7794, 82d Cong., 2d Sess. 7 (1952).
103. Federico, *New Patent Act*, *supra* note 100, at 23.

Judicial Interpretation

An early interpretation of the new statutory provision was provided by the Second Circuit in *Lyon v. Bausch & Lomb Optical Co.*[104] There, the patent was directed to a method of coating a lens in a vacuum which included the steps of preheating the optical surface, vaporizing the material to be deposited on the surface, and maintaining the lens in a heated condition during the deposition. Nowhere in the art was there a teaching of the expedient of heating the surface *during* the deposition. The invention yielded a lens with an adherent non-reflecting coating, a product diligently, but unsuccessfully, pursued for at least ten years by those skilled in the art. When it appeared, the process replaced the prevailing practice and substantially preempted the field. After weighing the patentee's evidence of long-felt need and commercial success, Judge Hand concluded: "We do not see how any combination of evidence could more completely demonstrate that, simple as it was, the change had not been obvious . . . to a person having ordinary skill in the art'—§ 103."[105]

The court's evaluation of the third prerequisite of patentability in terms of nonobviousness evidenced its recognition of the change effected by section 103. Indeed, Judge Hand asserted that

> had the case come up for decision within twenty, or perhaps, twenty-five, years before the Act of 1952 . . . it is almost certain that the claims would have been held invalid. The Courts of Appeal have very generally found in the recent opinions of the Supreme Court a disposition to insist upon a stricter test of invention than it used to apply—indefinite it is true, but indubitably stricter than that defined in § 103.[106]

Hand viewed section 103 as a codification of the test set forth in *Hotchkiss v. Greenwood*, which, if applied in the future, would relax the standards imposed by the Supreme Court in the years immediately preceding the Act and revive a uniformity long absent from the case law. In affirming this statutory purpose, he declared that "a legislature, whose will the courts have undertaken to proliferate, must be free to reinstate the courts' initial interpretation, even though it may have been obscured by a series of later comments whose upshot is at best hazy."[107]

Although the *Lyon* opinion was in harmony with both the plain language of section 103 and the legislative intent, Judge Hand's approach was not uniformly adopted. A number of courts, seizing upon the "codification" language of the Senate committee report,[108]

104. 221 F.2d 539, 106 U.S.P.Q. 1 (2d Cir.), *cert. denied*, 350 U.S. 911 (1955).
105. *Id.* at 535, 106 U.S.P.Q. at 5.
106. *Id.*
107. *Id.* at 537, 106 U.S.P.Q. at 7.
108. *See* S. REP. No. 1979, *supra*, note 88, at 1.

concluded that section 103 neither introduced a new test of patentability nor compelled a more moderate judicial disposition in evaluating patent validity. Accordingly, the opinions of these courts relied upon pre-1952 case law, such as *Lincoln* and *A & P* to test for the presence or absence of "invention."[109] A survey of appellate cases, decided after passage of section 103,[110] revealed that the First, Fifth, Sixth, Eighth and Ninth Circuits were of the opinion that no change was intended,[111] whereas the Third, Fourth and District of Columbia Circuits generally followed the Second Circuit in recognizing a new and more relaxed standard.[112] In reviewing the judicial attitude toward the new act, one court correctly characterized the divergence of opinion as a function of "the preexisting views of [each] tribunal as to the standard upon which it has determined patentability."[113] Uniformity, a primary goal of the 1952 Act, was thus frustrated by the failure of some courts to regard section 103 as controlling. Diversity of opinion flourished much as it had prior to passage of the Act.[114]

It was in light of this split among the circuits that the Supreme Court, in 1966, offered its interpretation of section 103. Choosing as its vehicle a trilogy of cases—*Graham v. John Deere Co.*,[115] *Calmar*,

109. *See* note 111 *infra*.
110. Note, *Standard of Patentability*, *supra* note 95, at 313-25.
111. *See* Selmix Dispensers, Inc. v. Multiplex Faucet Co., 277 F.2d 884, 125 U.S.P.Q. 378 (8th Cir. 1960); Caldwell v. Kirk Mfg. Co., 269 F.2d 506, 123 U.S.P.Q. 182 (8th Cir.), *cert. denied*, 361 U.S. 915 (1959); Wasserman v. Burgess & Blacher Co., 217 F.2d 402, 404, 103 U.S.P.Q. 368, 369 (1st Cir. 1954); Vincent v. Suni-Citrus Prods. Co., 215 F.2d 305, 315, 102 U.S.P.Q. 373, 381 (5th Cir. 1954) (dictum since effective date of § 103 subsequent to trial), *cert. denied*, 348 U.S. 952 (1955); Kwikset Locks, Inc. v. Hillgren, 210 F.2d 483, 100 U.S.P.Q. 289 (9th Cir.), *cert. denied*, 347 U.S. 989 (1954); General Motors Corp. v. Estate Stove Co., 203 F.2d 912, 918, 97 U.S.P.Q. 88, 92 (6th Cir.), *cert. denied*, 346 U.S. 822 (1953), *adopted in* Bobertz v. General Motors Corp., 228 F.2d 94, 99, 107 U.S.P.Q. 338, 341 (6th Cir. 1955), *cert. denied*, 352 U.S. 824 (1956); *cf.* Jeddeloh Bros. Sweed Mills, Inc. v. Coe Mfg. Co., 375 F.2d 85, 151 U.S.P.Q. 679 (9th Cir. 1967); Monroe Auto Equip. Co. v. Heckethorn Mfg. Co., 332 F.2d 406, 141 U.S.P.Q. 549 (6th Cir.), *cert. denied*, 379 U.S. 838 (1964); Ellis, Inc. v. Denis, 224 F.2d 311, 106 U.S.P.Q. 125 (1st Cir. 1955); Arnold Pipe Rentals Co. v. Engineering Enterprises, 350 F.2d 885, 889, 146 U.S.P.Q. 415, 418 (5th Cir. 1965); Stabler v. Bright Leaf Indus., 261 F.2d 383, 119 U.S.P.Q. 362 (5th Cir. 1958), *cert. denied*, 359 U.S. 960 (1959).
112. *See* Brown v. Brock, 240 F.2d 723, 728, 112 U.S.P.Q. 199, 203 (4th Cir. 1957); *cf.* Marvel Specialty Co. v. Bell Hosiery Mills, Inc., 330 F.2d 164, 141 U.S.P.Q. 269 (4th Cir.), *cert. denied*, 379 U.S. 899 (1964); R.M. Palmer Co. v. Luden's, Inc., 236 F.2d 496, 111 U.S.P.Q. 1 (3rd Cir 1956); L-O-F Glass Fibers Co. v. Watson, 228 F.2d 40, 107 U.S.P.Q. 197 (D.C. Cir. 1955) (appears to attempt to use obviousness standard although regards case law on "invention" viable after the act). *But see* Interstate Rubber Prods. Corp. v. Radiator Specialty Co., 214 F.2d 546, 548, 102 U.S.P.Q. 224, 226 (4th Cir. 1954). The Seventh and Tenth Circuits' views were regarded as unclear. Note, *Standard of Patentability*, *supra* note 95, at 322-23. Despite the Tenth Circuit's attempted application of the statute, neither court appeared to have recognized that a change was brought about by its passage. *See* Mott Corp. v. Sunflower Indus., Inc., 314 F.2d 872, 137 U.S.P.Q. 288 (10th Cir. 1963); Blish, Mize & Silliman Hardware Co. v. Time Saver Tools, Inc., 236 F.2d 913, 111 U.S.P.Q. 6 (10th Cir. 1956), *cert. denied*, 352 U.S. 1004 (1957); Blaw-Knox Co. v. I.D. Lain Co., 230 F.2d 373, 376, 108 U.S.P.Q. 356, 358 (7th Cir. 1956); Helms Prods. v. Lake Shore Mfg. Co., 227 F.2d 677, 683, 107 U.S.P.Q. 313, 317 (7th Cir. 1955).
113. R.M. Palmer Co. v. Luden's, Inc., 236 F.2d 496, 499, 111 U.S.P.Q. 1, 4 (3rd Cir. 1956).
114. *See* Note, *Standard of Patentability*, *supra* note 95, at 323.
115. 383 U.S. 1, 148 U.S.P.Q. 459 (1966).

Inc. and Colgate-Palmolive Co. v. Cook Chem. Co.,[116] and *United States v. Adams*[117]—the Court attempted to respond to the issues over which the courts of appeal had divided. In so doing, the Court essentially affirmed the position taken by Judge Hand in the *Lyon* opinion. Section 103 was held to be the applicable standard: "[W]e conclude here that the inquiry which the Patent Office and the courts must make as to patentability must be beamed with greater intensity on the requirement of section 103 . . . ."[118] The Court then set about defining the appropriate test by which to measure compliance with that standard.

Each of the three cases turned on the issue of nonobviousness. In *Graham*[119] and *Cook*[120] the inventions were found to be obvious and the patents in question held invalid. A contrary conclusion was reached in *Adams*.[121] Though the results differed, each opinion was marked by a carefully reasoned analysis focusing upon the question of obviousness or nonobviousness to one skilled in the art. The appropriate pattern of examination was set forth in *Graham*:

> [T]he scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the perinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc. might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.[122]

The Court considered this approach capable of fairly consistent application which would yield the predictability sought by section 103:[123] "We believe that strict observance of the requirements laid down here will result in that uniformity and definiteness which Congress called for in the 1952 Act."[124] Although the judge must ultimately reach a legal conclusion, he would be guided by consideration of factors reasonably determinable by factual proof, *e.g.* the prior art, the subject matter patented, the differences between them and the level of skill of those practicing the art. It is significant that whereas the language of section 103 lends itself to the test an-

116. *Id.*
117. 383 U.S. 39, 148 U.S.P.Q. 479 (1966). The three cases, *Graham*, *Cook* and *Adams*, are hereinafter collectively referred to as the *Trilogy*.
118. 383 U.S. at 19, 148 U.S.P.Q. at 467.
119. *Id.* at 25, 148 U.S.P.Q. at 470.
120. *Id.* at 37, 148 U.S.P.Q. at 474.
121. *Id.* at 51, 148 U.S.P.Q. at 483.
122. *Id.* at 17, 148 U.S.P.Q. at 467.
123. *See* notes 79-92 *supra*, and accompanying text.
124. 383 U.S. at 18, 148 U.S.P.Q. at 467.

nounced by the Court, the "requirement of 'invention'" suggests no particular method of determination. Indeed, the Court cited with approval its earlier observation that 'the word ['invention'] cannot be defined in such a manner as to afford any substantial aid in determining whether a particular device involves an exercise of the inventive faculty or not."[125]

The *Trilogy* was in further agreement with *Lyon* on the issue of the relevance of nontechnical evidence[126]—the so-called "secondary considerations."[127] Such factors are quite susceptible to factual determination, and where they reasonably evidence the level of skill in the pertinent art, or tend to demonstrate that the difference between the prior art and the claimed invention is greater than the level of skill in the art, they are to be given evidentiary weight.

The application of these principles can best be gleaned from the *Adams* case where the validity of the patent on a battery composed of magnesium and cuprous chloride electrodes was affirmed. The invention was truly revolutionary in that it was the first practical, operative constant-voltage battery which used plain water rather than the electroytes traditionally employed.[128] The invention, however, was extremely "close" to the prior art which suggested the equivalence of its electrode materials to those previously used. The Court was impressed with evidence of the battery's unexpected results, the previous failure of prior art teachings to yield operative devices and noted experts' initial expressions of disbelief in the success of such an invention.[129] Despite its apparent structural similarity to prior devices, consideration of *all* evidence led the Court to conclude that the invention was not obvious.[130]

The expressed relevance of the "secondary considerations" in the determination of nonobviousness and the impact of their application in *Adams* was in striking contrast to the Court's prior standards for the determination of "invention."[131] By stating that "[t]he emphasis on non-obviousness is one of inquiry. . . ."[132] the Court acknowledged

125. *Id.* at 11-12, 148 U.S.P.Q. at 464, citing McClain v. Ortmayer, 141 U.S. 419, 427 (1891).
126. This was the "objective" or nontechnical body of evidence employed by some courts both prior to and after the 1952 act as an aid in making the difficult technical decisions required for the resolution of patent contests. *See* notes 45-63 *supra*, and accompanying text; Note, "*Nonobviousness*", note 17, *supra*.
127. 383 U.S. at 17, 148 U.S.P.Q. at 467. These evidentiary considerations are "secondary" in the sense that they occupy a different level in the hierarchy of legal and factual conclusions. Obviousness is the ultimate issue; the claimed invention, prior art, level of skill in the pertinent art, and difference between the prior art and claimed invention as compared to the level of skill in the art are all sub-issues preliminary to the determination of obviousness. To resolve the crucial sub-issues a court entertains factual evidence such as the claims, specification and file history of the patent, prior patents, publications and testimony of those skilled in the art and any other facts such as commercial success and long-felt need.
128. 383 U.S. at 43, 148 U.S.P.Q. at 480.
129. *Id.* at 51-52, 148 U.S.P.Q. at 483-84.
130. For commentary on the *Trilogy*, see Kayton, *This Year (1966) in Patent Law*, 35 GEO. WASH. L. REV. 720, 721-25 (1966).
131. *See* notes 29-44, 64-78 *supra*, and accompanying text.
132. 383 U.S. at 17, 148 U.S.P.Q. at 467.

that the pattern of analysis, which it had outlined in *Graham*, was the very essence of the nonobviousness test. The application of that pattern in the *Trilogy* reflected the change necessitated by the test defined by Congress in section 103.[133] The Court insisted, however, that the change was one of "inquiry, not quality"[134] and that section 103 was intended to codify judicial precedents rather than alter the level of patentability.[135] In short, its conclusion was that while section 103 provided a new test, it did not mandate a more moderate judicial attitude. That position seemed inconsistent with the legislative intent. The issue was mooted, however, by the Court's substantive interpretation of section 103 and utilization of its pattern of factual analysis. The very application of the *Trilogy* analysis would tend to moderate the pre-1952 level of patentability by effecting predictable results. It provided, as the Court suggested, "a more practical test of patentability"[136] productive of objective evaluation and increased liberality in the consideration of the patentee's evidence.

After The Trilogy

In general, the courts of appeal responded to the *Trilogy* analysis by directing attention to the requirements of section 103.[137] A First

133. *See* notes 79-103 *supra*, and accompanying text.
134. 383 U.S. at 17, 148 U.S.P.Q. at 467.
135. *Id.*, 148 U.S.P.Q. at 466. It is interesting to note that the Court also denied that it had taken an increasingly strict posture during those years preceding the act. 383 U.S. at 19, 148 U.S.P.Q. at 467. Such a belief would tend to prevent the Court's acceptance of statutory moderation of case law standards since prior judicial strictness was a fundamental premise of the relaxation theory. *See* Lyon v. Bausch & Lomb Optical Co., 224 F.2d 530, 536, 106 U.S.P.Q. 1, 6 (2d Cir.), *cert. denied*, 350 U.S. 911 (1955). However, there is evidence that observers viewed such decisions as *Lincoln*, *Cuno* and *A & P* as deviations from earlier opinions. *See* notes 98-103 *supra*, and accompanying text. More importantly, the circuit courts of appeal viewed those decisions by the high court as having raised the level of patentability. See notes 37, 38 & 84 *supra*.
136. 383 U.S. at 17, 148 U.S.P.Q. at 467.
137. *See* University of Ill. Foundation v. Winegard Co., 402 F.2d 125, 159 U.S.P.Q. 129 (8th Cir. 1968), *cert. denied*, 394 U.S. 917 (1969); Kaiser Ind. Corp. v. McLouth Steel Corp., 400 F.2d 36, 158 U.S.P.Q. 565 (6th Cir. 1968), *cert. denied*, 393 U.S. 1119 (1969); Commissioner v. Deutsche Goldund-Silber-Scheideanstalt, 397 F.2d 636, 157 U.S.P.Q. 549 (D.C. Cir. 1968); Colourpicture Publishers, Inc. v. Mike Roberts Prods., Inc., 394 F.2d 431, 157 U.S.P.Q. 659 (1st Cir. 1968), *cert. denied*, 393 U.S. 848 (1969); National Connector Corp. v. Malco Mfg. Co., 392 F.2d 766, 157 U.S.P.Q. 401 (8th Cir.), *cert. denied*, 393 U.S. 923 (1968); Preuss v. General Elec. Co., 392 F.2d 29, 157 U.S.P.Q. 177 (2d Cir. 1968), *cert. denied*, 393 U.S. 831 (1969); Greening Nursery Co. v. J & R Tool & Mfg. Co., 376 F.2d 738, 153 U.S.P.Q. 660 (8th Cir. 1967); Sisko v. Southern Resin & Fiberglass Corp., 373 F.2d 866, 152 U.S.P.Q. 7 (5th Cir.), *cert. denied*, 389 U.S. 824 (1967); Ling-Temco-Vought, Inc. v. Kollsman Instrument Corp., 372 F.2d 263, 152 U.S.P.Q. 446 (2d Cir. 1967); Skee-Trainer, Inc. v. Garelick Mfg. Co., 361 F.2d 895, 150 U.S.P.Q. 7 (8th Cir. 1966); Jones Knitting Corp. v. Morgan, 361 F.2d 451, 149 U.S.P.Q. 659 (3d Cir. 1966). Despite the fact that the courts looked to section 103 more closely and couched their analysis in terms of obviousness or nonobviousness to one of ordinary skill in the art, some cases reflected adherence to the notion that section 103 was little more than a restatement of case law using the phrase "nonobviousness" as a synonym of "invention." *See* B.F. Goodrich Co. v. Rubber Latex Prods., Inc., 400 F.2d 401, 405, 158 U.S.P.Q. 513, 516 (6th Cir. 1968); Higley v. Brenner, 387 F.2d 855, 858, 155 U.S.P.Q. 481, 484 (D.C. Cir. 1967) (claimed invention nonobvious); Ludwig Drum Co. v. Solar Musical Instrument Co., 376 F.2d 827, 830, 153 U.S.P.Q. 579, 580 (6th Cir. 1967); *cf.* Carson v. Bland, 398 F.2d 423, 158 U.S.P.Q. 529 (10th Cir. 1968); Schmidinger v. Walsh, 383 F.2d 455, 155 U.S.P.Q. 289 (3d Cir. 1967), *cert. denied*, 390 U.S. 946 (1968) (claimed invention found to be nonobvious); Borden Co. v. Clearfield Cheese Co., 369 F.2d 96, 152 U.S.P.Q. 369 (3d Cir. 1966) (summary judgment of invalidity reversed on the finding that the issue of obviousness had not been adequately treated).
In addition, there was a general reluctance to give significant weight to the so-called "secondary considerations" even where nonobviousness was the standard applied. *See* Kaiser Indus. Corp. v. McLouth Steel Corp., 400 F.2d 36, 158 U.S.P.Q. 565 (6th Cir. 1968), *cert. denied*, 393 U.S. 1119 (1969); National Connector Corp. v. Malco Mfg. Co., 392 F.2d 766, 157 U.S.P.Q. 401 (8th Cir.), *cert. denied*, 393 U.S. 923 (1968); *Greening Nursery Co. v. J & R Tool & Mfg. Co.*, 376 F.2d 738, 153 U.S.P.Q. 660 (8th Cir. 1967).
138. Colourpicture Publishers, Inc. v. Mike Roberts Prods., Inc., 394 F.2d 431, 434, 157 U.S.P.Q. 659, 661 (1st Cir. 1968).
139. Hensley Equip. Co. v. Esco Corp., 383 F.2d 252, 258 n.10, 155 U.S.P.Q. 183, 187 n.10 (5th Cir. 1967).
140. *Id.* at 258, 155 U.S.P.Q. at 187.

Circuit opinion, reversing a summary judgment of invalidity, evidenced this new attitude: "[I]t is apparent that the [district] court's conclusory comments as to 'lack of invention' fall short of that 'strict observance' of Graham's emphasis on an inquiry 'beamed with greater intensity on the requirements of § 103.' "[138] Seeking conformity with the *Graham* statement of the nonobviousness test, the Fifth Circuit stated:

> It is desirable that the district courts make specific findings on the factual matters which the Supreme Court, in Graham v. John Deere Co. . . . held determined obviousness: the state of the prior art, the level of ordinary skill in the art, and the difference between the prior art and the claims of the patent at issue.[139]

Moreover, that court specifically approved the district court's utilization of the "secondary indicia of commercial success and industry recognition of satisfaction of unsolved needs, referred to in *John Deere*."[140]

The *Trilogy* appeared to have subdued the conflict which had previously existed among the courts of appeal. By stressing the nonobviousness language of section 103 and delineating the pattern of analysis to be utilized in testing for the presence of this third statutory prerequisite of patentability, the Supreme Court had effectively disposed of the old tests of "invention." It was against that background of increasing appreciation of the *Trilogy* guidelines that *Black Rock* came to the district court.

Anderson's-Black Rock, Inc. v. Pavement Salvage Co.

In The Lower Courts

The asphalt paving industry had long been plagued with the problem of a deficient joint produced when a fresh strip of pavement was laid

next to another that was cold. Heating, and thereby softening, the side of the strip already in place was known to encourage a good bond between the fresh and the old strips. Means of heating the asphalt, however, were inadequate. The patent in *Pavement Salvage Co. v. Anderson's-Black Rock, Inc.*[141] was drawn to a paving apparatus which included a heater capable of emitting highly penetrative radiant energy. The prior art disclosed the use of radiant heat to facilitate the bonding of asphalt. The specific heater used by the patentee was a prior art radiant heater; it was neither new nor patentable.

Testing the combination of paver and heater against the standards set forth in *Lincoln* and *A & P*, the district court concluded that combined the elements functioned as they did in tandem and held the patent invalid.[142] The patentee's assertions of commercial success and long-felt need were deemed unavailing in the absence of "invention."[143]

Responding to the *Trilogy* guidelines the Fourth Circuit reversed the district court's decision.[144] Rather than speaking in terms of old elements and combinations thereof, and tests which reveal little as to the obviousness of uniting them, the court posed this issue: "[T]he question is whether, in light of the availability of more efficient radiant energy generators, the answer obviously lay in the theretofore unworkable and discarded art of heat treatment."[145] The error of the lower court lay in its assumption that the problem could be solved by heat treatment with the specific radiant energy source. Acknowledging earlier use of radiant heaters in asphalt bonding, the Fourth Circuit noted that those employed had been ineffective because of their inability to yield sufficient penetrative heat.[146] The majority reasoned:

> Had it been known that the result could be achieved by a generator and a paving machine handled separately but cooperatively, combining the two in one machine for the sake of convenience would have been an obvious step, but that was not known. Neville [the patentee] supplied the whole answer which had completely eluded the industry. His contribution cannot be judged without reference to its salient feature, disclosure of the fact that the solution lay in the use of a specified kind of infra-

141. 404 F.2d 450, 159 U.S.P.Q. 513 (4th Cir. 1968).
142. *Id.* at 455-56, 159 U.S.P.Q. at 517. The district court opinion was unpublished. The dissent to the appellate court opinion, however, adopted the lower court position and reproduced portions of the unpublished decision. *Id.* at 454-55, 159 U.S.P.Q. at 516-17.
143. *Id.* at 455, 159 U.S.P.Q. at 517.
144. 404 F.2d 450, 159 U.S.P.Q. 513 (4th Cir. 1968).
145. *Id.* at 452, 159 U.S.P.Q. at 514.
146. *Id.* at 451, 159 U.S.P.Q. at 514.

red generator in combination with the basic paving machine.[147]

The Court of Appeals was impressed with evidence of the need for the apparatus, the continuing efforts to satisfy that need, the incredulity of those skilled in the art when originally confronted with the invention and its substantial success once the industry was convinced that it worked as claimed. In contrast to the trial court, the majority considered that evidence relevant "'indicia of obviousness or nonobviousness'" as recognized by *Graham*.[148] Thus, after applying the *Trilogy* analysis the court concluded that it would not have been obvious to one of ordinary skill in the art to select the particular claimed radiant heater as the source of heat in the asphalt paving machine.[149] As nonobviousness was the salient test, the invention was patentable.

In the Supreme Court

The Fourth Circuit opinion represented an able application of the test of nonobviousness. Its review would have been an excellent opportunity for the Supreme Court to reaffirm the standards of section 103 set forth in the *Trilogy*—particularly as they related to mechanical combinations—and to quell the vitality of the tests of "invention" stated in *Lincoln* and *A & P*. Indeed, certiorari was granted,[150] but the result was not a restatement of *Graham*. To the contrary, in an almost incredible reversal of position, the old tests of "invention" were elevated to the status of new tests of patentability, and the plain language of section 103, the legislative purpose and the Court's previous construction were nullified.

The Court, speaking through Justice Douglas, applied a test of patentability bearing little similarity to that outlined in the *Trilogy*. By limiting inquiry to determination of whether the elements functioned in combination in any manner different from the way they would function in tandem,[151] Justice Douglas joined in the district court's assumption that the use of the specific radiant heater in the process of paving asphalt was known,[152] thereby regarding patentability as pivoting on the distinction between elements combined on one chassis and those maintained apart.[153] Unless

147. *Id.* at 454, 159 U.S.P.Q. at 516.
148. *Id.* at 452, 159 U.S.P.Q. at 514.
149. *Id.* at 454, 159 U.S.P.Q. at 516.
150. 394 U.S. 916 (1969).
151. 396 U.S. at 60, 163 U.S.P.Q. at 674.
152. The Court said that "experts tendered by respondent testified that they had been doubtful that radiant heat would solve the problem of the cold joint. But radiant heat was old in the art." 396 U.S. at 59-60, 163 U.S.P.Q. at 674. The court of appeals had acknowledged that radiant heat was taught in the art, but on the basis of the evidence found that those skilled in the art had turned away from the heat treatment to pursue other means of solving the problem. The specific radiant heater claimed and not disclosed in the paving art was found to produce the solution, and therefore the court of appeals regarded as nonobvious the selection of that heater for use with the standard paving gear. The Supreme Court did not respond to this reasoning, but rather proceeded from the premise that the particular radiant energy generator was recognized as useful in the paving of asphalt.
153. *Id.* at 60, 163 U.S.P.Q. at 674.

the elements in some way affected one another so that the effect produced by the whole exceeded the sum of the individual effects of its component parts, there was no "invention."[154] This was the test of *Lincoln* and *A & P*[155] and was as inappropriate to determination of the obviousness of the combination in 1969 as it had been before the 1952 Act.

Graham, however, was not ignored in the Court's opinion. After concluding that the patent was invalid under the old test of "invention," the Court justified its holding by citing *Graham* as authority for the propositon that section 103 merely codified the prior case law.[156] Finally, the *Graham* test of nonobviousness was quoted, but never actually applied. Without additional explication, the Court summarily concluded that "to those skilled in the art the use of the old elements in combination was not an *invention* by the obvious-nonobvious standard."[157] It is apparent that the Court resolved the validity of the patent on the basis of "invention." This is a plain reversal of the *Trilogy* instruction to emphasize the nonobviousness test of section 103.

While the Fourth Circuit was persuaded by nontechnical evidence, the Supreme Court treated such "secondary considerations" as irrelevant. The Court resorted to *A & P* for the proposition that these matters "without invention will not make patentability."[158] This view also represents a complete reversal of the *Trilogy*, as the Court there indicated that such factors were to be considered in the course of rendering a decision on obviousness.

In the final analysis, though *Lincoln*, *A & P*, section 103 and *Graham* all appear in the same opinion, they cannot co-exist in the determination of patent validity.. The vague usage of "invention" to define patentable subject matter is not the same as the pattern of

154. *Id.* at 61, 163 U.S.P.Q. at 674.
155. *Id.* at 60-61, 163 U.S.P.Q. at 674.
156. *Id.* at 62, 163 U.S.P.Q. at 675.
157. *Id.* (emphasis added). The Court made reference to 35 U.S.C. § 101 (1964) in note 4, asserting that "[a]bsent here is the element 'new' . . . [since] the combination added nothing to the inherent characteristics or function of the radiant burner." Then, the Court *further* concluded that the invention was obvious. It appears that invalidity was grounded on a lack of novelty, 35 U.S.C. § 102 (1964), yet the record was clear that although the elements were known per se, their combination was not directly taught in the prior art. The inquiry should therefore have been conducted under section 103.
The Court intimated that § 101 was the appropriate provision for determination of the validity of combination patents, although §§ 102 and 103 prescribe the specific circumstances under which the invention lacks novelty or is obvious. In view of these sections, there is really no need to speak in terms of combinations of old elements; there is no basis for distinguishing them from other inventions nor for holding them to a higher standard of patentability. The standards expressed in § 103 are applicable to all inventions, whether the prior art is extensive and close or sparse and unrelated.
158. *Id.* at 61, 163 U.S.P.Q. at 674.

analysis inherent in the determination of obviousness or nonobviousness set forth in section 103 and clarified in the *Trilogy*.[159] The revitalization of pre-1952 standards with all their inadequacies can occur only at the sacrifice of the advantages which flow from the statute. The problems which confronted the patentee before the 1952 legislation—absence of predictability in the approach adopted by the courts, inability to rely on evidence which logically establishes the degree of advance in the art represented by his invention, substantial likelihood of a finding of invalidity—will surely plague him again. The *Black Rock* decision essentially turns the clock back to that era by adopting the law as it was prior to the enactment of section 103.

After Black Rock

The *Black Rock* opinion appears to have already had some impact on the courts, and predictable trends are discernible even now. *Black Rock* and the *Trilogy* are clearly at odds on the issue of the relevance of the "secondary considerations." In *Stevenson v. Diebold, Inc.*,[160] the Ninth Circuit concluded that plaintiff's conveying device was an obvious development in light of a similar, previously patented invention. Although both machines were attempts at accomplishing the same result, the plaintiff's invention succeeded where the other had failed. The claimed device enjoyed commercial success and, as the court observed, most of the earlier machines were converted into the type developed by the plaintiff. The court, however, relying upon *Black Rock* to support its disregard of plaintiff's "secondary" evidence of nonobviousness,[161] concluded that the plaintiff's device was simply a modification of the prior invention, made obvious by the prior teaching of a third party.

The *Black Rock* position cannot be confined to commercial success but will rather be assumed to apply to the spectrum of "nontechnical" evidence. Conversion of the machines in the *Sterenson* case is an example of such evidence.[162] In another Ninth Circuit case, *Bada Co. v. Montgomery Ward & Co.*,[163] the authority of *Black Rock* was invoked to justify the court's conclusion of obviousness in the face of conceded commercial success and solution of what had been a problem in the pertinent industry.[164] While some cases decided since *Black Rock* have regarded such evidence as relevant,[165] it is diffi-

159. *See* notes 115-36 *supra*, and accompanying text.
160. 422 F.2d 1228, 165 U.S.P.Q. 10 (9th Cir. 1970).
161. *Id.* at 1233, 165 U.S.P.Q. at 14.
162. *See* notes 45-63 *supra*, and accompanying text; Note, "Nonobviousness", note 17 *supra*.
163. 426 F.2d 8, 165 U.S.P.Q. 483 (9th Cir. 1970).
164. *Id.* at 10, 165 U.S.P.Q. at 484.
165. *Cf.* National Athletic Supply Corp. v. Tone-O-Matic Prods., 421 F.2d 407, 164 U.S.P.Q. 330 (5th Cir. 1970); Technograph Printed Circuits Ltd. v. United States; — F.2d —, 164 U.S.P.Q. 584 (Ct. Cl. 1970); Brown v. Myerberg, — F. Supp. —, 164 U.S.P.Q. 505 (S.D.N.Y. 1970); Nashua Corp. v. RCA Corp., 307 F. Supp. 152, 165 U.S.P.Q. 89 (D.N.H. 1969).

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cult to reconcile that reasoning with the position of the Supreme Court as expressed in *Black Rock*. Most courts, it is submitted, will follow the lead of the High Court.

Erosion of the viability of these "secondary considerations," as proof of nonobviousness, can be expected to increase the likelihood that courts will grant summary judgments of invalidity. In *Palmer v. United States*,[166] the Court of Claims denied the government's motion for summary judgment holding that "plaintiffs are entitled to their day in court to make out what case they can for unobviousness."[167] The court's conclusion, however, was premised upon acceptance of commercial success and satisfaction of long-felt need as evidence of nonobviousness.[168] Similarly, in *Faraday, Inc. v. Audio Devices, Inc.*,[169] a district court concluded that under the rule announced in *Graham* such considerations were germane "even if they cannot 'breathe life' into a patent otherwise invalid."[170] Despite its failure to delineate the weight to be given these factors, the court indicated that the presence of such evidence would discourage it from granting summary judgment.[171] It is suggested, however, that if the position in *Black Rock* is taken to its logical extreme, courts will hold all such evidence irrelevant and grant summary judgment more readily.[172] This would appear to be the view adopted in *Pacific International Plastics v. Sterling Plastics Corp.*[173] There, the court, ignoring affidavits filed in support of the patentee's claim of commercial success, declared that consideration of such evidence "could not affect the result."[174]

Just as the holdings in *Lincoln* and *A & P* could not have been limited to patents claiming combinations of mechanical elements, it would be unsound to so confine *Black Rock*. Recent cases reflect a growing recognition of the sweeping significance of the combination concept. In *Bada Co. v. Montgomery Ward & Co.*,[175] the invention was a four-step method of balancing automobile tires. After citing the prior art which, in the court's opinion, disclosed the individual steps but not the claimed combination thereof, it characterized the invention as "merely a combination of known prior art elements."[176] Similarly, in *Indiana General Corp. v. Krystinel Corp.*,[177] chemical combinations were equated with mechanical combinations,[178] and in *Deere Ltd. v. United States*,[179] the Court of Claims analogized combinations in the electrical field to those of the type considered in *Black Rock*.[180] Thus, the *Black Rock* doctrine has broad applicability, extending to virtually every patent suit.

Perhaps the most dire consequence of *Black Rock* is the judicial attitude it establishes toward questions of patent validity. The Ninth Circuit recognized the posture assumed by the Supreme Court when, in *George J. Meyer Manufacturing Co. v. San Marino Electronic Corp.*,[181] it affirmed the trial court's conclusion of invalidity for obviousness, stating: "The result reached . . . is in accord with the statutory requirement of nonobviousness and the 'strict observance' of the statute required by the recent decisions of the Supreme Court."[182] Only *Black Rock* was cited and the court implied that the decision there compelled a "strict" construction of section 103, "strict" meaning adverse to patentees. As used in *Graham*, "strict" observance of section 103 was the Court's direction to the Patent Office and the courts to discontinue their practice of rendering decisions on the basis of the harsher and less objective pre-1952 "invention" standard, and instead follow the statutory guidelines.[183] *Black Rock* has totally reversed that command and from *Meyer Manufacturing* it appears that at least one court of appeals reads the Supreme Court as taking a discordant view toward patent validity.[184] Other courts will be likely to adopt this attitude.

A recent district court case provides a good example of how a patentee can be faced with an apparent presumption of invalidity where the appellate courts have reflected a hostile judicial attitude toward patents. In *Woodstream Corp. v. Herter's Inc.*,[185] the inventions of the two patents in suit were animal traps. The court indicated that the traps were substantial improvements over previous traps, were significantly more humane and enjoyed considerable commercial success. Ultimately, the court found the inventions

166 — F. Supp. —, 155 U.S.P.Q. 524 (Ct. Cl. 1967), *aff'd*, 182 Ct. Cl. 896, 156 U.S.P.Q. 689 (1968).
167. *Id.* at —, 155 U.S.P.Q. at 528.
168. *Id.* at —, 155 U.S.P.Q. at 527.
169. — F. Supp. —, 165 U.S.P.Q. 634 (S.D.N.Y. 1970).
170. *Id.* at —, 165 U.S.P.Q. at 638.
171. "That there is evidence of commercial success or failure may at least require added caution on a motion for summary judgement." *Id.* at —, 165 U.S.P.Q. at 638. *See* Colourpicture Publishers, Inc. v. Mike Roberts Color Prods., Inc., 394 F.2d 431, 157 U.S.P.Q. 659 (1st Cir. 1968).
172. Of course, those courts which continue to give full weight to nontechnical considerations will surely follow the reasoning of *Palmer*.
173. 305 F. Supp. 1341, 164 U.S.P.Q. 35 (C.D. Cal. 1969).
174. *Id.* at 1344, 164 U.S.P.Q. at 38.
175. 426 F.2d 8, 165 U.S.P.Q. 483 (9th Cir. 1970).
176. *Id.* at 10, 165 U.S.P.Q. at 484.
177. 421 F.2d 1023, 164 U.S.P.Q. 321 (2d Cir. 1970).
178. *Id.* at 1033, 164 U.S.P.Q. at 329.
179. 420 F.2d 1010, 164 U.S.P.Q. 348 (Ct. Cl. 1970).
180. *Id.* at 1024, 165 U.S.P.Q. 359.
181. 422 F.2d 1285, 165 U.S.P.Q. 23 (9th Cir. 1970).
182. *Id.* at 1289, 165 U.S.P.Q. at 27.
183. *See* Graham v. John Deere Co., 383 U.S. 1, 17, 148 U.S.P.Q. 459, 466 (1966); *see* notes 115-36 *supra*, and accompanying text.
184. *Meyer Manufacturing* is but one of a string of Ninth Circuit cases holding the patent in suit invalid. Others decided since the *Black Rock* opinion was handed down are: Bada Co. v. Montgomery Ward & Co., 426 F.2d 8, 165 U.S.P.Q. 483 (9th Cir. 1970); Stevenson v. Diebold, Inc., 422 F.2d 1228, 165 U.S.P.Q. 10 (9th Cir. 1970); Hamlow v. Scientific Glass Apparatus Corp., — F.2d —, 164 U.S.P.Q. 340 (9th Cir. 1970); Spring Crest Co. v. American Beauti Pleat, Inc., 420 F.2d 950, 164 U.S.P.Q. 281 (9th Cir. 1970); Carborundum Co. v. Wilbanks, Inc., 420 F.2d 43, 164 U.S.P.Q. 271 (9th Cir. 1969).
185. 312 F. Supp. 369, 165 U.S.P.Q. 609 (D. Minn. 1970).

obvious, noting the absence of a "'flash of creative genius.'"[186] Initially, however, the court observed that:

> The courtrooms within the province of the Eighth Circuit Court of Appeals do not afford a congenial forum to the holder of a United States patent. A reading of the decided cases clearly reflects this. . . . I can find no record of the Eighth Circuit Court of Appeals upholding the validity of a patent since Graham. It did so sparingly before Graham.[187]

It is submitted that this recognition of adversity toward patents by appellate courts and the concomitant likelihood of reversal in the event validity were upheld, prejudices those courts against the patentee. In view of the atmosphere created by the Supreme Court in *Black Rock*, it may not be long before all the courts will be paraphrasing the district court in *Woodstream* and acknowledging that "the courts of the United States do not afford a congenial forum to the holder of a United States patent."

Conclusion

While the response of a particular court may not be predicted with absolute certainty, it may be presumed that *Black Rock* will revive the divergence once prevalent among the circuits. The availability of a broad spectrum of language, ranging from the tests of *Lincoln* to the analysis of the *Trilogy*, places a patentee in the impossible position of attempting to estimate the strength of the case he must make to secure a patent. Further, the rigorous position taken in *Black Rock* seriously jeopardizes existing patents. This is precisely the situation which preceded the 1952 Act and prompted its enactment. Just as Congress was then the only body capable of affording relief, so it appears to be now. If Congress acts, however, it should make clear its policy with regard to the patent system and offer no opportunity for a further re-vitalization of the old tests of "invention." Recognizing that courts will seek means of relying on *Lincoln*, *A & P* and now *Black Rock*, the tests of validity espoused by these cases should be expressly discarded. Prompt and decisive action by Congress is mandatory if we are to retain a viable patent system.

Herbert Mintz
Charles L. O'Rourke

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186. *Id.* at 373, 165 U.S.P.Q. at 612. It is particularly disturbing to see the "flash of genius" rhetoric of Cuno Eng'r Corp. v. Automatic Devices Corp., 314 U.S. 84, 51 U.S.P.Q. 272 (1941), which was discarded by the second sentence of section 103. *See* Harris, *Legislative Intent*, *supra* note 98, at 679.

187. 312 F. Supp. at 371, 165 U.S.P.Q. at 610. The Court listed 14 Eighth Circuit cases decided between 1966 and 1969 in which the patents were held invalid. *Id.* at 371 n.1, 165 U.S.P.Q. at 610 n.1.